

Quantum characters: proposing a new metaphor

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Abstract

The conventional metaphors for quantum characters serve poorly. In the place of *particle* and *wave*, this paper proposes use of the same metaphor as used in the context of spacetime. In an extended thought-experiment, we research potential usefulness by attempting to conceive how particular quantum actors may be modeled on this metaphor's basis. Surprisingly, we find the models are at once simple and yet strikingly effective in providing a coherent and conceptually satisfying mechanical explanation for many phenomena. Coincidentally, they also happen to eliminate previous exceptions that were granted to light in regard to constancy in its speed and direction of travel. As a final bonus, they model quantum characters in one and the same context as, and for such reason implicitly unified with, gravity.

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1. Introduction

Much of human comprehension is based in metaphor. Especially when encountering new phenomena or probing into areas of murkiness, it's our tendency to seek understanding via reference to objects that are familiar. When we find a fit, it's often like the proverbial "light going on." Frequently we are inclined to say something like: "I see, what's happening is that a [fill in the blank] is pushing on a [fill in the blank]." Typically, we do not mean the newly conceived objects are exactly the same as a familiar item. Rather, we mean merely that they share common patterns, and so we expect interactions between them will likely involve dynamics similar to those we've repeatedly witnessed in connection with the familiar. Because we *are* familiar with such dynamics in one context, moreover, it seems sensible to imagine they might occur in another. It's usually at this point we feel there is comprehension.

Of course, if we choose metaphors that are inapt, comprehension suffers. This is undeniably the case in today's quantum mechanics. Presently there are two metaphors, used schizophrenically in reference to subatomic actors: *particle* (conjuring the image of a tiny bit of solidity) and *wave*. While each provides serviceable performance in some contexts, each fails as often (and in the same instances) as the other succeeds. Overall, because there is no coherence between them (and because in consequence each fails so frequently), the metaphors serve poorly.

Though sometimes lamented,¹ this fact is thoroughly accepted. Indeed, the general view is that the small world is so different from common experience as to make coherent metaphor impossible. In this view we cannot hope to sensibly conceptualize, by metaphor, the dynamics taking place there. Instead, we must imagine subatomic actors as little more than oblique abstractions ("smudges of probability" is a common phrase), each having precise mathematical properties, but otherwise fitting at best (and at times) partially to one metaphor, and (at other times) partially to the other.

But must it be so? Is it possible a better metaphor is available, that might consistently fit all the involved patterns and thereby invite a coherent conceptual comprehension of the interacting mechanics? Is it possible such a metaphor is available, and yet has been missed for so long? On the face of it, the answer seems doubtful. So many brilliant minds have been over, under and around the territory, if such a metaphor were available, you'd think it would have been developed already. But what if such a metaphor was available, and had simply been missed? How tragic would it be if we continued this neglect?

My interest is that of an outsider, for my professional training is in another field—a situation that does not typically bode well for the prospect of making a real contribution. But if ever a situation was ripe for a "fresh pair of eyes," this may be it. Regardless, my simple request is to let the analysis speak for itself. Is it logical? Is it coherent? Does it demonstrate not only that the proposed metaphor works in conjunction with all of today's facts, but that it works better (in terms of inviting comprehension on a single, coherent basis), and with greater parsimony, than present alternatives?

¹Though knowing it's the sure sign of a crackpot to quote Einstein, it's nonetheless significant to note that *some* characters (he among them) protested acceptance of poor metaphors:

"Almost imperceptibly, the theoretical physicists adapted themselves to a situation which, from the standpoint of their mechanical programme, was very depressing . . . [f]or whereas they previously had required of a conclusive theory that it should content itself with the fundamental concepts which belong exclusively to mechanics (e.g. densities, velocities, deformations, stresses) they gradually accustomed themselves to admitting electric and magnetic force as fundamental concepts . . . without requiring a mechanical interpretation for them. Thus, the purely mechanical view of nature was gradually abandoned. But this change led to a fundamental dualism which in the long run was unacceptable."

Einstein (1920).

Please note that, though involving no mechanical apparatus, computer simulations, surveys, statistical methods or mathematical formulae, this paper reports on *research*—specifically, into what can be accomplished, conceptually, when attempting to comprehend the known facts of quantum mechanics on the basis of its proposed metaphor. By reason its very nature, such “research” must be performed by *thinking about* where and how the metaphor might apply, and by comparing the degree of utility offered, particularly as compared against conventional metaphors.

Long ago we learned that knowledge of our world is *not* obtained by mere thought (apologies to Plato). Empiricism rules absolutely. But when the very question is what kind of thought may best be used in attempting to get a better mental handle on what we’ve already empirically discovered, in that particular instance, thought about thought is research indeed. This paper reports on precisely that.

2. The General Foundation

Almost intuitively, physicists expect to find unity in nature. Virtually as an article of faith, they assume that a given phenomenon can be explained by more basic phenomena, which will inevitably have broader application than the first. As a simple example, water and air appear different, yet we know from mere chemistry that each are made from overlapping constituents. On a much deeper level, physicists live daily with demonstrations that matter and energy are but different manifestations of an even more basic stuff.

And what of that more basic stuff? In quantum mechanics the question is answered with a semantic, virtual non-answer, for the very basic is simply called *energy-matter*. While there’s no argument from cosmologists, they nevertheless pay much more attention to another concatenation of words, speaking often of *spacetime*.

In point of fact, no one denies that ultimately spacetime and energy-matter must themselves be but varying manifestations of the *most* basic stuff. This raises the question: Is there a potential metaphor, for the quantum actors involved in energy-matter, that would make a more explicit recognition of this commonness?

In comparison to quantum mechanics, relativity holds few mysteries. Though strange to a neophyte, its mechanics are straightforward. It conceives of spacetime, basically, as a compressible, quasi-fluid medium. At least it might be said this is the typically-preferred metaphor for spacetime—a unitary, coherent metaphor that works consistently across the broad range of involved experience. To state it differently, there is no fault in the metaphor, especially as compared against the gross debilities suffered by both particle and wave in connection with the quantum characters of energy-matter.

To examine it from another perspective, it’s evident we have two, seemingly irreconcilable realms of conceptual modeling. But we believe the very most basic, from each, must in a sense equate, one to another, in terms of the “ultimate stuff” involved (much as on another level we realize energy is matter and matter is energy). For our mental modeling within one realm, we’ve chosen a good and consistent, single metaphor. For the other, we’ve been for some generations struggling with that fighting, inconsistent duo.

With that as the scenario, consider: What could be more obvious than to try the first metaphor in connection with the second realm? More specifically, rather than conceiving of quantum characters as being in one sense like waves and another like particles, why not employ the same metaphor that’s used consistently for spacetime? Why not, in other words, use the metaphor of a compressible, fluid medium?

Why not, indeed, be even more audacious by attempting to mentally model quantum actors, directly and immediately, with the supposition they are, literally, nothing more than structural variations within and of spacetime? (This obviously imports that realm's metaphor by default.)

That is the simple essence of my proposal.

But as merely that, obviously, it's meaningless. To test the notion, we must see whether it's beneficial to re-think what we already know about quantum actors, but with the new metaphor as our conceptual basis. In such an endeavor, we obviously cannot help but consider how, in particular, elements of spacetime might be structured on a nano-scale to account the phenomena involved. This means that, merely because of the new metaphor, we'll inevitably invite an imaginary modeling of such structures—a kind of spacetime nano-modeling that is, obviously, not mainstream. Arguably, this makes the endeavor more ambitious than *merely* proposing a new metaphor. But it can't be helped. By its nature, a new metaphor demands this kind of process.

More specifically, with recognition that we must so model to test the metaphor, the task will be to see whether it's possible to imaginatively configure a set of spacetime models that reasonably implies a workable mechanics for the phenomena involved. And not just that it "fits the bill" in the sense a pet theory may bend to accommodate the *ad hoc* needs of a moment; rather, we must see whether by virtue of their inherent character these models *demand* the phenomenal attributes in question. Indeed, upon having constructed a model to answer one set of attributes, we should see whether it implicitly (i.e., accidentally) demands many others. And, of course, we must test to assure no false attributes are implied. Finally, we should ask whether the implicit explanations are conceptually satisfying, especially as compared against the degree of vision granted under conventional metaphors.

That is the research this paper reports on, and (indeed) actively rehearses.

The basic research question: Can we construct models under the proposed metaphor that meet the above-described tests. If we can, I'll submit, it's a metaphor that needs further consideration.

3. Beginning Observations

The most startling difference with this new metaphor is that, instead of thinking of subatomic objects and their accompanying fields as things that essentially *overlay* (or reside within) spacetime, we instead conceive them as structural variations *of* spacetime. And rather than separately conceiving a putative "particle" and its surrounding "field" as though they are separate but connected entities, we instead conceive each part as contiguous elements in a single structural system (one structural entity, in other words, will be defined as encompassing both "particle" and "field"). This results in the fact that we'll conceive electrons and protons as objects that in total (i.e., including both core and surrounding field) are rather macro in size.

As we think on the basis of this new metaphor, we are essentially extending cosmological views of a rumpled and twisted spacetime into the small and minor scale. At first there may be objection, since we know in the cosmological context it requires massive bodies to significantly distort spacetime. However, cosmology involves a particular kind of spacetime distortion (i.e., gravity), one that happens by its nature to involve broad and (except in extreme cases) comparatively gradual density slopes. By virtue of that fact alone, there is no reason to conclude smaller and more localized distortions (typically involving much steeper though shorter slopes) must follow the same rules. Indeed, the objection indicates how habituated we've become to (and in a sense imprisoned by) inapt metaphors.

As we engage in this task of modeling, it's important to remember, that's all the process is. We are not attempting to teach physicists any new phenomenal facts (they already understand those very well). On the contrary, we're looking for nothing more than *conceptual* improvement (i.e., a better *interpretation* of quantum phenomena). If the models work, it's only because, with help of the new metaphor, they are already implicit in the vast and enormous discoveries that have previously been hewn from hard-won experiment, calculation and thought. Please also note that, while I will propose a particular set of models to illustrate potential usefulness in the metaphor, it will not be my purpose to insist any particular one is the best or most perfect for such purpose. Even *if* the metaphor is useful, my models are likely no better than crude approximations, at best.

4. Varying Densities, Slopes Between and Opposing Vectors of Impetus

Beginning with the naked notion of wanting simply to conceive and model quantum actors as particular kinds of spacetime structural variation, we must ask what does this specifically imply? To answer, we must consider that within the lattice of spacetime's 3+1 known dimensions there is but one additional, varying characteristic that is presently well-established: *density*. Certainly, in the effort to conceptualize subatomic actors as mere variations in spacetime, we might imagine the medium holds other characteristics (such as more dimensions, for example). But that would be poor economy. Instead, it requires much less invention if we simply suppose that, by way of irregularity, subatomic actors involve nothing more nor less than regions where spacetime densities are skewed up or down (and in any of several particular patterns) vis-à-vis the surrounding spacetime plane. That, essentially, is the new metaphor in a somewhat more specific nutshell.

Of course, if you have a nano-region of higher density and a nearby one of lower density, it implies a gradient between—a slope—which is significant because we know slopes can do interesting things.

And this reminds again, the general conception is not novel. As intimated, we already know spacetime is very much like this at the cosmic scale. It is a rumpled terrain, with countless density peaks and canyons, and almost everywhere slopes angled this way or that between. My only leap is to suggest a somewhat similar topography in the same fabric, but on a much smaller (and again tighter) scale.

But significantly, differences in scale imply differences in behavior and interaction, and as a generality there is one in particular we should note in terms of the “interesting things” slopes might do. At the astronomical level (i.e., gravity), we find one, pretty much vanilla-flavored phenomenon in this regard: slopes induce an impetus of mass *toward the direction of greater density* (the other side of this coin, of course, is that a slope locally bends spacetime as viewed externally; however, while this is interesting, it will be easiest if we view the coin from only its first side for now).

If such single-vector action is somewhat boring, it occurs because (virtually by definition) mass implies greater spacetime density than any “empty” spacetime surrounding. So, in the realm of the large, we have the simple rule that greater density is impelled in a slope toward greater density—which raises the question: what about in the small world where quantum characters (as I propose to model them) interact with their density peaks and/or canyons? If any of these possess nano-regions that are comparatively spacetime vacuous, might we not expect such opposite-than-mass features to be impelled, in a slope, opposite the typically-expected vector (i.e., *toward the direction of lesser density*)? If so, we'd have not just a vanilla-flavored impetus/phenomenon, but a chocolate one too.

While at first blush this concept may seem radical, it is not. In regard to the variety of its interactions, the small world is, in point of fact, far more interesting than the astronomical one, so it needs chocolate and vanilla. It needs a basic impetus, in other words, that may occur along either of opposite vectors,

depending on circumstances. And it makes sense, for if I'm a corpuscle of spacetime vacuity, it's logical to think I'd "seek" like vacuity by tending to move within a slope toward the direction that promises similar low density—just as, obviously, a corpuscle of comparative spacetime density (i.e., mass) "seeks" like density by tending within a slope to move toward high density.²

At any rate, this is the one grand assumption that's essential for my theme. With it as the basis, I can somewhat more specifically say it will be my purpose, as I finally turn to specific modeling, to see if it's possible to imagine particular patterns of *density variation* in spacetime—patterns that, with nothing beyond their own structure and this simple assumption about impetus vectors brought to the equation, might reasonably account for fundamental phenomena as encountered in connection with subatomic actors.

5. The Problem of Charged Actors and Multiple Forces

Let's begin our modeling by considering the most basic of atomic constituents: electrons and protons. These are funny actors. As opposites, they have an uncanny attraction one for another, yet each is repelled from its like. Either impetus increases with proximity, beginning at a very weak level at ranges familiar to the human hand and becoming intense as distances approach the infinitesimal. Most curiously, at even nearer ranges the impetus reverses. Force two protons into virtually the same space, and suddenly their ferocious animosity ends. Now they're determined to cling in the most resolute embrace.

In Physics 101 this is conventionally explained by imagining separate overlapping "forces" (in particular, the electrical and strong force), each deemed as having different and competing characteristics. Sadly, this is more akin to imagining the existence of multiple and warring gods (each ascribed varying personalities) than it is a satisfying "oh,-because-of-this-single-and-underlying-structure,-we'd-have-to-expect-these-results" kind of model. Physics 401 does little better. There's at least a stab at conceptual unity when it's loosely imagined that both strong force and electrical force are the particularized manifestation of a generalized photon exchange. But that's more a mathematical device (though a most successful one) than a mechanical model of explanation.

Is it possible to conceive a pair of spacetime structures that, employing themes described at the outset, might (on the basis of one such fabric) account for these phenomena? In fact (and here is the great surprise), it is!

Remember, our task is to describe a structural topography (of varying densities, involving peaks, canyons and slopes between) arranged in such fashion as to induce the particular phenomena in question.

In this regard, let us envision electrons and protons as each involving a spacetime density slope that begins, most gradually, at a radius that is contiguous with the reach of each object's conventionally-conceived electrical field. The incidence of slope builds geometrically with increasing proximity to center—precisely mimicking the extent and intensity of the conventionally conceived electrical field, for we are simply postulating that what we've previously thought of as an electrical field is, literally, but a slope of spacetime.

It's near the center where it gets interesting. There (or at least at some point infinitesimally near), we'll imagine the surrounding slope reaches its point of most extreme density (or vacuity, depending on the

²Mathematically, it's obvious this would also be mandated. Take any equation that purports to predict a spacetime slope-induced impetus on mass, change the value for mass from positive to negative, and it's obvious the formula must, accordingly, produce an opposite-direction force vector.

slopes vector)—then reverses. While the surrounding terrain had sloped gradually but increasingly toward this point, here (so near the center as to be all but on it), and with a radius of turn so tight as to define the rim of a charge structure's core, the terrain now strikes at near vertical angle toward the very opposite density pole.

In short, at center of each structure is an extreme reverse slope. This forms a minute core, for each, where density plummets (or ascends) in a direction opposite its periphery. Because of this, a cross-sectional graph of the involved density patterns would somewhat resemble the outline of a volcano, with crater at center (or the inversion of such).³

As should be obvious, I'm imagining that the crater (or core) of these structures is precisely contiguous with what is conventionally thought of as the actual bodies of proton and electron (of course, I am also conceiving each as a unitary structure, rather than as object and accompanying field, as is conventionally the case).

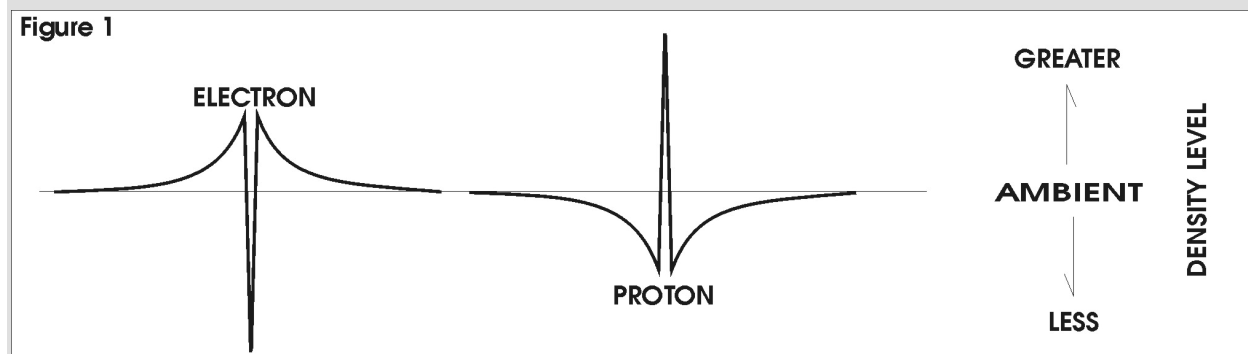
With this structure supposed, let us ask: what is the difference between proton and electron? It would be, primarily, that one is an inverted image of this scheme (at least substantially) vis-à-vis the other. Thus, if the proton is characterized by ascending peripheral slopes and plunging core, we'd assume an electron involves a descending periphery with a density spike at center (which is which does not matter to this analysis).

But does it work? If we conceive these two structures, does it provide a conceptual basis by which we may at least purport to explain the phenomena involved?

Let's begin with the phenomenon of like-to-like repulsion. For this purpose, suppose I am the density spike of an electron's core, and happen to find myself inhabiting a region of spacetime that falls within the peripheral slope of a brother electron. Remember, those slopes *ascend* from a region of spacetime vacuity (at the inverted rim surrounding my brother's core) toward a region of ambient density that's reached some distance away. Since I am myself spacetime dense (again, we're imagining I am the *core* of my electron), it follows I'll be impelled in the direction of increasing density—which is away from him.

Most obviously, we could examine the same circumstances, but while concentrating on my brother and his situation instead. With but tiny thought, it's evident his core will find itself in precisely the same circumstance, vis-à-vis me and my peripheral slope, as I found myself in regard to him and his slope. Thus, he'll be just as impelled away from me (within my periphery) as I was from him.

³For illustration, the imagined density graph for each structure would look something like the following:



Of course, this and other drawings are intended but to illustrate *concept* only. There is no claim such drawings are in any sense, aside from that, accurate.

The story for protons, and like-to-like repulsion, is not un-similar. Here we'll imagine I am the density crater at center of some proton. I find myself inhabiting a region of spacetime that is within the peripheral slope of a sister proton. This slope descends from high density at the rim surrounding my sister's core, toward ambient some distance away. Finding myself between such points (i.e., within a slope where density decreases as distance increases from my sister's core), it's evident I'll "see" the prospect of lower density in a vector that looks away from her. Thus, since I am myself light on density (being a density crater, and all), it's inevitable this slope will exert an impetus that pushes me away.

Much as we did with the electron brothers, we could examine it from my sister's perspective, and again we'd see a mirror image of my circumstance: she's every bit as impelled from me (thanks to my peripheral slope) as I am from her.

So, having found our model is successful in allowing us to picture a conceivable spacetime mechanics for like-to-like repulsion, let's see what it does for attraction between opposites.

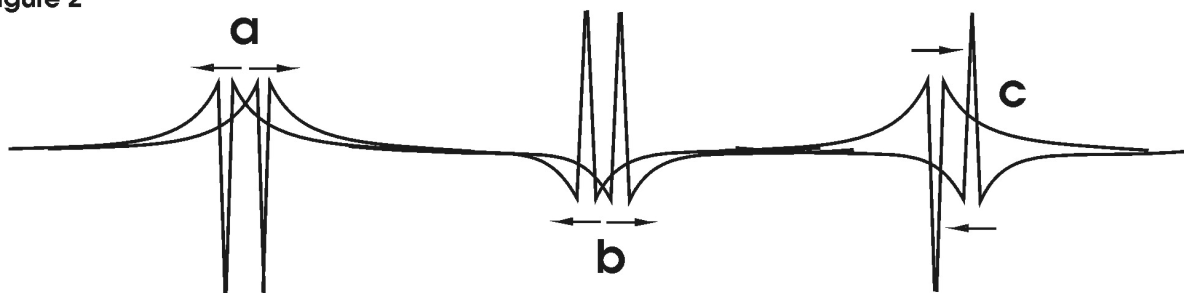
To begin this errand, suppose again I am the density spike at core of an electron. But now, rather than inhabiting a spacetime region that's within a brother electron's peripheral slope, I instead find myself residing in a sister proton's slope. As you'll recall, that slope descends from the dense rim (surrounding her crater's core) toward ambient density (as found at the furthest reaches of her periphery). Or, putting it oppositely, it ascends (from ambient at those furthest reaches) toward the very dense rim at her core. Again, as an electron's core (and as we're imagining it) I am a density spike, which is another way of saying I'm a tiny concentration of density. Since I am dense, I'll feel the urge to move (within my sister's slope) toward the direction of increasing density—which (as we've just seen) is toward her core.

We can now look at my counterpart's story, and though we'll again find that the situation is *essentially* mirrored, for cross-gender attraction, we'll see, the names and places must at least be changed to keep the description accurate.

Specifically, suppose now I am a proton's core, inhabiting a brother electron's sloping periphery. As previously imagined, his periphery slopes increasingly downward as it approaches his vacuous rim. And, as also imagined, I am myself a vacuous crater. Since decreasing density is toward him, obviously that is my force vector.⁴

⁴The conception can be illustrated for proton-to-proton repulsion as in (a) below, and for electron-to-electron repulsion as in (b). By contrast, opposite-to-opposite attraction is illustrated in (c).

Figure 2



As you can see, the general notion is very simple, and completely effective on a conceptual level, at least.

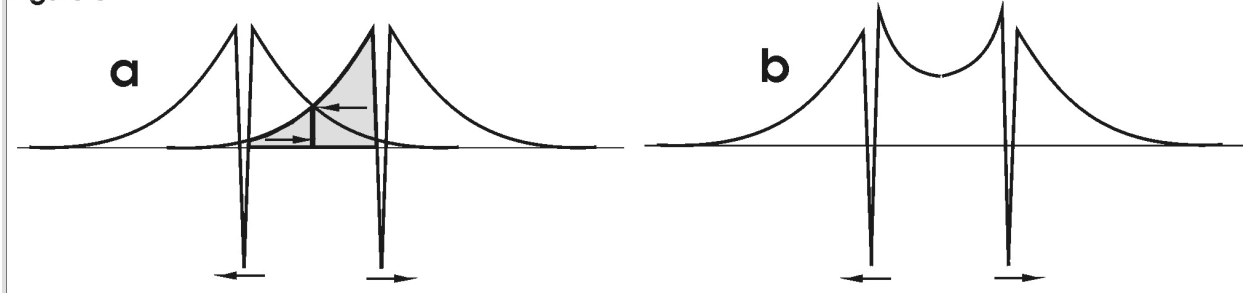
I was happy when initially thinking through these concepts to find it was indeed possible to imagine spacetime models that could seemingly account, coherently and simply, for the basic elements of electrical interaction. Indeed, I was delighted to see the models not only allow the phenomena, but seem to demand them (the phenomena in question *could not help but be* if the models are true). I was likewise happy to note the models are in themselves considerably less complex than the phenomena they purport to explain.⁵

Of course, we have only dealt with the most basic elements of electrical interaction. We should see what utility the models offer (or not) when tried against other phenomena.

More particularly, the above discussion only visualized the potential dynamics as involved when the core of a proton or electron (as we've postulated them) finds itself within the *peripheral* slope of a neighbor. There was no consideration as to what might happen if the core of one object made it past the periphery of its sibling—thereby (and to some extent at least) finding itself within (and so sharing) the very core space of a neighbor.

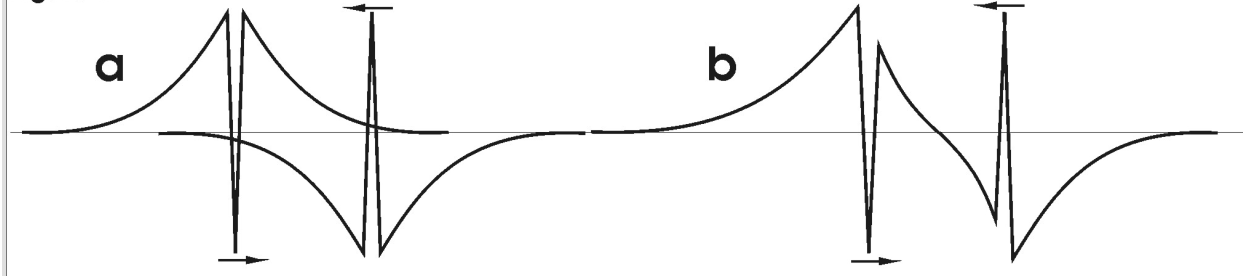
⁵Even so, there is undoubtedly significant over-simplification in my manner of description. For example, I've described it as though you could have multiple densities in one and the same point of space time, when in fact each point can have but one density (which will obviously be the *sum of densities* brought by the varying structures which affect that point). As another matter, I've argued as though only the *core* of an electron/proton structure would be impelled in the slope of its neighbor, when in fact we'd expect all parts to be impelled within whatever slope they confront. This would obviously make the conceptual description somewhat less obvious, but even so, when we correct for both simplifications simultaneously, the expected result holds.

Figure 3



Considering proton-to-proton repulsion, for example, you may note in (a) above that one part of the second proton's peripheral slope might arguably be impelled in one direction in reference to its neighbor's slope, and another portion in the opposite direction. Effectively, these should approximately cancel each other out, leaving the *core's* impetus as the primary effective actor. Turning to (b) in the same figure, we have there summed the densities brought by the two structures to show a more realistic picture of net total density for each region. In its own way, this makes the net repulsive impetus even more obvious than otherwise.

Figure 4



In considering attraction between opposites and likewise reckoning for any periphery-to-periphery induced impetus as in (a) above, opposition between different slope portions is less obvious, but regardless, when densities are summed as in (b), the expected force vector again shows through.

So let's keep supposing.

If I am the minute crater at core of a proton, I'll obviously resist getting intimate with any sister's core (by reason of her repelling peripheral slope, as above described). Indeed, the nearer any outside force pushes me toward her core, the more strenuously I'll resist (by reason of finding myself in regions of increasingly severe repelling slope). But if some force (countering my own urge otherwise) proves sufficient to force me all the way past her last and most intense peripheral grade, I'll inevitably find myself at her rim. Once at that point, obviously, I'll resist no more. I will not, for now I am past any resistance-inducing slope.

Indeed (and much more than that), once I reach the point where, conceivably, I *could* balance precariously on my sister's rim, it will require but a quark's breath further inward movement to place me in a very opposite territory: my sister's crater slope. Significantly, that slope *plunges* toward vacuity, and I am likewise vacuous. Given this, though but the tiniest distance back I'd been ferociously resisting inward movement; here I'll find (according to my own vacuous state and the slope I face) there is nothing I desire more, than to move in even tighter. In fact (and for comparison), given that this downward core slope is more severe than even the steepest ascending periphery, it follows that I'll embrace this new intimacy with greater ferocity than even the greatest repelling force encountered outside.

The phenomenal result as just described is identical to what is conventionally described as resulting from competition between the strong force (which is said to pull protons strongly toward one another at very near distances) and electrical force (which is thought of as simultaneously seeking to force them apart, though more weakly and over greater distances). The conventional model, obviously, would picture my model's "rim" as the place where those competing forces precisely balance one another, my crater as where strong force overpowers electrical force, and my peripheral slopes as where electrical force overpowers strong force.

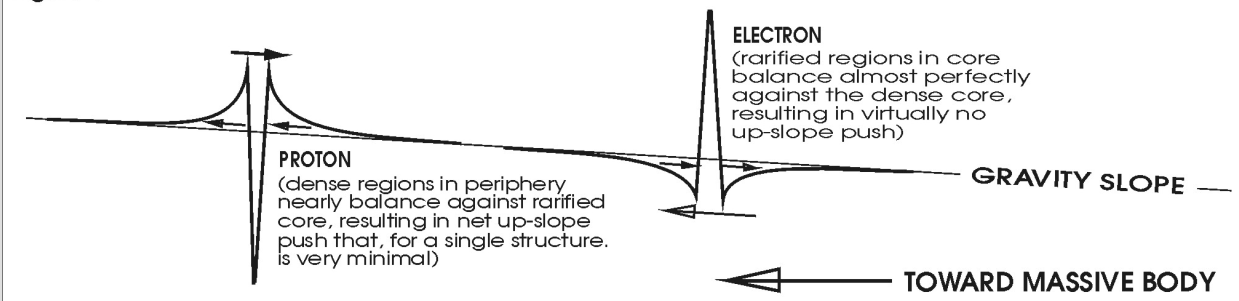
Regardless, both models predict fusion (when two protons are forced very near one another, and finally embrace) and fission (where any that were formerly fused find themselves but barely outside the other's rim, resulting in the phenomenon of each flying violently down the other's sloping periphery). There's a large difference, however, in that our new model gets there with greater economy—especially considering that it postulates nothing more (as its basis in ultimate substance) than the same spacetime that we know everything resides in, regardless.

We might also consider what happens if opposite-gender actors were to try getting cozy like our fused protons. Remember that unlike two protons, they are peripheral-area-*attracted*. Given this, it might seem there's a danger that opposite charges might pull in on one another to their own state of fusion—indeed, that all potential pairs might do it everywhere, thereby ending the beauty of a world where (to use a pun) electrons maintain their separate orbit. But examining the model, it's evident that when any pair of opposites attempt such intimacy, they face opposite core interaction as compared to two protons. In short, at intimate ranges each finds a core slope in its counterpart that repels. Thus, our imagined structure incidentally provides a built-in mechanism to keep opposites safe from world-killing intimacy.

It is significant that such happy results are not achieved via careful fine-tuning of the model. On the contrary, every phenomenal element is the unavoidable consequence of our beginning and simple assumptions.⁶

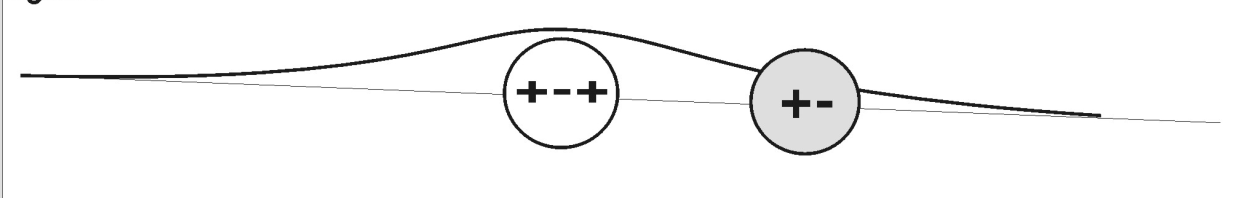
⁶In a general sense, it might *seem* impossible that a charge field could be a slope *in and of* the same spacetime as gravity, since the two are seemingly so disconnected. Consider, for example, that a proton is strongly impelled in an electron's slope, but hardly at all in gravity. How can this be, if the slopes are of the same spacetime? Answer is found by comparing relative size of slopes. Gravity's slope is of such great breadth that (in its respect) *all* of a charged structure is entirely encompassed within a uniform grade. This means *all parts* of the latter are subjected to the *same degree of gravity slope* (dense parts being impelled in one vector therein, and vacuous parts oppositely). This allows the gravity-induced impetus of its core to be virtually balanced by peripheral impetus (as in Figure 5)—leaving but minute net result. By contrast, where a charge structure works within the slope of another, there is always a portion of its periphery that's outside the other's slope, plus the encountered grade varies. Thus (and for charge-to-charge interaction), there is potential for significant *imbalance* in resulting impeti—nicely explaining why there, because of difference in scale and shape of slope encountered, we can witness such different interaction as compared to gravity—notwithstanding that all are slopes in the same spacetime.

Figure 5



For an opposite problem, suppose we take a glass ball and rub it with fur to remove electrons. This creates a surplus of protons and thus a robust charge slope surrounding the ball (a slope that has power to exert considerable force against any nearby charged objects). But if we take an electrically-neutral object, (like a steel ball that has equal protons and electrons) we'll encounter no directional impetus within that slope, in spite of the fact that it will continue to encounter *much* impetus from gravity. How is it, if that charge slope really is a density gradient in spacetime just as is gravity, the electrically-neutral steel ball is not impelled by it?

Figure 6



Basically, it's a matter of mathematics, for we've already seen that because of differences in comparative scale (which parts overlap and which do not), charge structures are but weakly impelled within the large-scale slope that is gravity, though they're strongly impelled in the small scale charge slope that is the periphery of another such structure. With this in mind, it's evident that to predict the net force that *should* be encountered by our steel ball, we simply must add the expected forces that properly apply for kind of slope in question. Each proton in the steel ball is, of course, strongly repelled within the glass-ball-induced charge slope, just as each electron is strongly attracted. Thus, for the particular kind of impetus that results from this scale of slope, each charge's impetus is counteracted by another, resulting in no net impetus. For the kind of impetus that results from the larger-scale slope that is gravity, by contrast, there is no countervailing impetus. Thus, each structure adds its own tiny contribution to make a net impetus that is rather significant, within that larger-scale gravity slope. It simply makes sense.

As a final query, one might wonder why is it that gravity produces attraction only, while charge slopes (though made of the same stuff) produce attraction *and repulsion*. In answer: we've obtained repulsive forces for small structures by imagining that extreme inversion at their cores. For gravity, we assume no such inversion.

6. Magnetism

While obviously related in its operational mechanics to electrical charge fields, magnetism exhibits characteristics that are rather different—so different one might doubt if the same metaphoric method could suggest an underlying mechanics that works for it too.

As insight to a working model, we should note that magnetic fields result when, and only when, a charged actor (typically an electron) moves. And, significantly, they are also *perceived* only by a charged actor that is likewise moving. This reality would seem to be an important hint. So using the new metaphor, let's ask what might we logically predict would happen, to surrounding spacetime, as the disturbance that is an electron passes rapidly through it? The answer is easy. There will be a wake.⁷

Which means what? Let's again consider basics. Our metaphor postulates that electrons and protons are disturbances in spacetime in the specific sense they encompass a particular pattern of density peaks and canyons. So what is a wake? Roughly (and to continue the metaphor), it also is a disturbance that involves density peaks and canyons of a particular pattern. But besides the fact their patterns must be different, there's a more critical distinction. By their very nature, wakes are *moving* entities.

So what do wakes do to other things? If you're fishing from a stationary boat and another motors rapidly by, its wake may jostle and offend you, but your net state of motion will remain constant. If you're also motoring, on the other hand (particularly in about the same direction and speed as the other boat), you may encounter some interesting effects. If you're just behind and attempting to overtake the other's wake, you may find your boat slows, and without more power is unwilling to resume a speed that may have previously been sufficient to pass. Plus, you may have to fight at the wheel to maintain direction. But once over and on the downhill side of the wake, you'll find your boat accelerating (even if with slightly reduced power), and perhaps again you'll have to fight at the wheel to maintain desired direction.

In a nutshell, wakes exert a net-motion effect on other things when those other things are also moving—and, importantly, in such manner as to be able, essentially, to surf on the moving slope that is the wake.

⁷An objection might be raised based on the fact that, in the macro world, wakes always equate with dispersal of energy from the generating object. In the case of a boat moving through water, for example, it requires a constant expenditure of energy for the boat to maintain speed. Part of that energy goes into production of the wake, to such an extent that a boat owner can essentially see his fuel dollars undulating away in wakes left behind. Returning to consideration of the electron, it's obvious that any similar dynamic would be disastrous, for the electron presumably has no fuel dollars to spend.

However, even in the macro-world we sometimes encounter a rather different scenario. If, for example, you're in a boat that's moving at "hull speed" (i.e., the maximum efficient speed before the boat begins to climb on top of its bow wave in the effort to plane), something very interesting happens: the wake essentially moves with you, in a complimentary fashion, at your same speed and direction of travel. In consequence, even as you cut the engine this wake *attempts* to push you along in a continuation of the travel you had previously maintained. Of course, because of hull friction, it manages the feat but briefly. Also, there's a gradual outward dispersal of the wake-action (and loss of its concomitant energy) regardless.

But what if instead of assuming our boat is on the open sea, we instead place it in a very narrow canal that's lined on both sides with vertically smooth concrete walls. In this case there can be no outward dispersal of the boat's wake, so we'd expect that a self-reinforcing system of cooperatively moving boat and wake would be far more efficient. Indeed, to maintain movement within such a scenario a hull-speed moving boat would need to expend only enough energy to compensate for losses to friction.

In the system I've imagined for a moving electron, presumably, there'd be a similar self-sustaining dynamic between the moving electron and its wake. But in contrast to our macro world, in this world there obviously must be no losses to friction.

To put this another way, wakes effectively become the means by which objects that are moving in a fluid medium communicate directional force/impetus to other objects, similarly moving, but with which there is otherwise no physical connection.

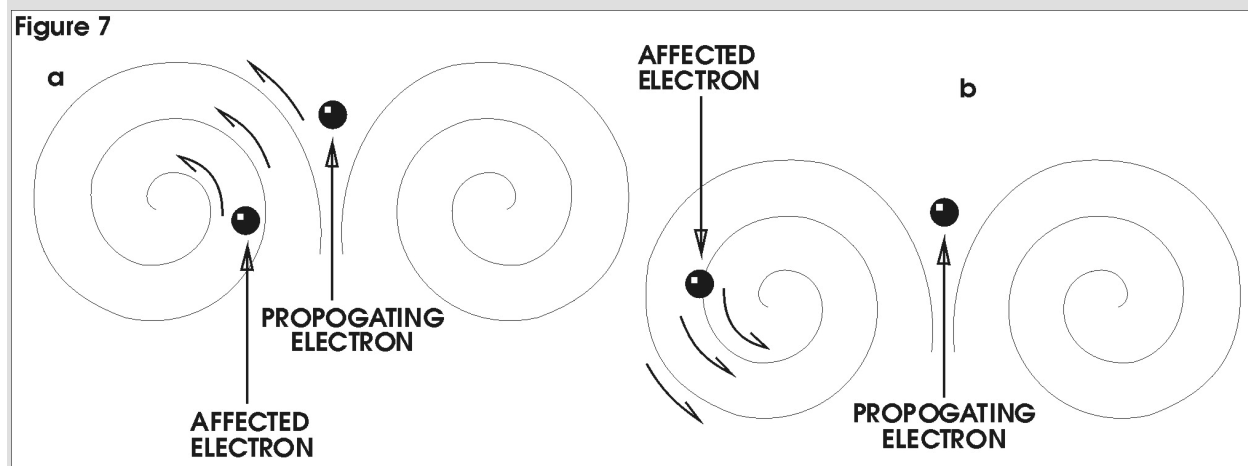
With so simple reality, can we doubt but that the notion of spacetime wakes is the best metaphor with which to model and comprehend the mechanics of magnetism?

It is beyond my scope here to postulate a specific model suggesting how interactions between the slopes of a wake and other moving electrons might sensibly lead to the particular attributes of magnetism as we know them (the number of interacting slopes and their geometry suggest the modeling task may be quite complex). Suffice it to say, the principle makes sense as a mere generality, and it seems the task of specific modeling may be more a matter of “filling in the blanks” than of outright invention.⁸

Let us simply note that, continuing with our simple, single-tapestry metaphor, we’ve found a conceptually satisfying (indeed, apparently illuminating) basis with which to comprehend (at least potentially) the mechanics of another phenomenon.

⁸As a potential speculation, you’d logically think an electron's wake *might* consist of a roiling type of action, such as (for example) the swirls we’ve seen around the vertical column of a nuclear explosion. Assuming this kind of structure, we can inquire as to which parts of that action might manage to induce alteration in travel by nearby electrons that are likewise traveling, though in varying directions. In particular, we might consider in what direction their paths might be diverted.

In this regard, let us imagine a surfer at the beach. Obviously, he cannot “catch a wave” by traveling opposite its direction of travel. Instead, he must paddle fast in roughly its same direction. Only then can he hope to begin riding down its sloped face. If we imagine that a moving electron faces similar constraints in regard to any possibility of riding upon the sloped face of a brother's wake, we can examine some possible scenarios.



As a first possibility, assume I'm an electron moving in the same direction as another, as in (a) above. In this case it appears the section of vortex I may ride is one that will ultimately divert me away from him (if you imagine my path as involving *any other part* of the swirl, you'll see its direction would be against or cross-wise to my path, and hence would not be a section I'd likely “ride.”) Alternatively, suppose I'm an electron traveling opposite my brother's path, as in (b). Now it appears (on basis of the same principle) the region of potential ride is one that will carry me toward him. Third (and not illustrated), suppose I'm an electron traveling at right angles yet toward my brother; here it appears I'll be diverted to parallel his path. Lastly (and also not directly illustrated), suppose I'm an electron traveling at right angles yet away from my brother; now it appears I'll be turned opposite his path.

7. Light and its Interactions with Matter

We know light is typically generated (or, putting it another way, "photons go flying off") when an electron moves with some particularly significant vigor through spacetime. In other words, it does not generally happen as electrons orbit lazily around the atomic nuclei in an iron bar at room temperature. The electrons must be induced to a more extreme, violent level of orbit before they'll throw off a photon (after which, we know, they fall back to a lower orbit).

In this regard, let's think again about those orbiting electrons as envisioned when discussing magnetism. Using the proposed new metaphor, we pictured them not merely as consisting of a particular pattern of distortion in spacetime *in and of themselves*, but of inducing a particularly-patterned spacetime wake in consequence of their movement. With this in mind, what might we suppose is happening when an electron is in a higher, more vigorous atomic orbit than is involved within that cold iron bar?

For insight, I reflect on my experience during lazy, low-wind sailing days. Often, lying at the side of my boat, I've idly trailed an oar in the water. Angling the blade but slightly from the direction of travel, I've found it generates a smooth wake that remains nicely attached to the blade. As I increase the angle of incidence, however, the flow becomes increasingly agitated. Finally (and always at about the same angle for a given speed), genuine turbulence sets in, and suddenly I'll see little spinning eddies, or corkscrews of water, go twirling off and away.

It seems reasonable to think moving electrons might induce a similar dynamic as they move through spacetime. As long as the movement is not too violent, the accompanying wake remains smooth, non-turbulent, and travels perfectly with its parent. Thus, in such a mode nothing is lost from the system of moving electron and accompanying wake; it remains entirely coherent with nothing broadcast outside the local process area. As the electron's motion increases, however, it tears more vigorously against spacetime, challenging its ability to spring and recoil. At some point there's a rift, and suddenly a little uncontained eddy goes spinning away. Of course, with the loss of energy represented, the electron loses speed and drops to a lower orbit in the atom that contains it.

The metaphor seems workable on several levels.

First, we know photons have a direction of travel—as do the spinning eddies suggested here. Second, we know photons are individual, quantum actors—as are spinning eddies (i.e., you can't do commerce in half-eddies). Third, while they are quantum characters, photons vary one from another in two qualities (beside direction of travel): wave-length and polarity. So do our imagined eddies, for there are, presumably, varying rates in their speed of rotation, and varying planes of rotation. Fourth, photons require some minimum threshold of violence before they are generated—as is already implicit in our discussion. Fifth, electrons give up something in terms of their own motion when a photon goes flying off (the counterpart of this is the increased drag I feel in my oar as an eddy goes spinning away, which must in fact slow the boat, even if imperceptibly). Finally, while it's impossible to predict precisely when a particular electron will eject a photon, the events nevertheless follow predictable probability curves. This is also consistent. If an electron is traversing sedately through spacetime, we'd expect a rift to occur infrequently. If it moves more frenetically (straining, as it were), then we'd expect the rifts to be more frequent. Again, it fits.

So if that's the new metaphor's basic application in respect to light, is there anything more specific we can do with it?

To start, we know light generally travels in a straight line. Indeed, we know it's traveling straight even as, from our perspective, it seems to bend when traversing the mammoth gravity fields surrounding celestial

bodies. This is true because, as briefly mentioned, another way of looking at spacetime density slopes is to think of them, alternatively, as *curves* in spacetime. Thus, the light that traverses a large gravity field is not, from its perspective, bending at all. On the contrary, it's obeying its own personal mandate: to travel straight and true through the spacetime it confronts.

With this as the foundational rule for light and its mode of travel, consider: why does it bend (slightly at least) around corners between rooms in your house? Why does it bounce off a mirror? Why does it bend (and seemingly slow down) when passing through a prism?

Our new metaphor makes the first question easy, and again, the phenomenon in question (diffraction) is something we'd expect on its basis even had we not already encountered it. Recall the spacetime model I've proposed for electrons and protons, particularly considering the ascending peripheries that I've urged may be a better metaphor with which to conceive an electron's surrounding electrical field. Recall that these peripheral parts are imagined in this context as slopes—spacetime slopes. Then remember that, from an external perspective, light will always appear to bend when traversing spacetime slopes (or putting it differently, those slopes in fact constitute curves in the spacetime fabric).

So imagine I'm a photon hurtling along on a trajectory that will take me very near the outside corner between rooms in a house. As I enter an area near the many atoms composing that edge, I find myself suddenly in spacetime that, on the nano-level (and because of the intermingling peripheries of all the nearby electrons), is rather rumpled and curved—at least that is the way we see it from a macro perspective outside that immediate area. But if I am a photon that's actually passing through it, I'm totally ignorant of that outside perspective. All I see is the particular and immediate spacetime I confront. Through that, I chart my path straight and true. In result, the trajectory I end up with, from the perspective of those with the outside macro perspective, may well be something of a diversion—and a somewhat random one to boot. Obviously, this fits the facts of diffraction rather well.⁹

The second and third problems are slightly more difficult, but also nicely workable. Happily, we'll also bring along mechanically-modeled answers to questions such as: why are some materials transparent and others not, what's behind the facts of partial reflectivity, and what about wave interference?

Let's consider refraction. Assume I'm a photon hurtling toward a prism, charting my path straight and true (just as my own physical mandates dictate). Suddenly, within the atomic matrix of the prism itself, I find myself in the rather significant curve that's induced by (or, rather, is partly of structure of) an electron that lies near my path. In particular, I'm so near the electron's core as to be in a region of slope/curve that is steep. Naturally, traveling straight so far as any reality I can see, I follow this curve (something like a space probe bending in its trajectory when near a planet). And no sooner do I leave its slope than I find myself traveling very near another electron, its slope curving steeply in the opposite direction. Again, from my perspective, I travel straight and true. And the process continues, with me traversing from one electron's steep slope to the next as I weave my way through the glass matrix. But don't forget, the path is straight from my perspective, as it should and must be.

It is only from the perspective of an external observer (i.e., someone looking from outside the nano-rumpled spacetime fabric within the prism) that my path will appear circuitous. And significantly, in terms of that outside perspective (because in its terms my path was in fact serpentine), it will also appear I have traveled further, while within the glass, than its outside dimensions would seem to allow. Or, in the

⁹On tighter consideration, I think this explanation over simplifies. More probably, I suspect the phenomenon involves an interaction of passing photons with the matrix of corner material, somewhat along the lines as considered for other phenomena later in this discussion.

more typical way of looking at it, it will appear I have "slowed" in my rate of travel while within the glass. Regardless of the perspective you choose, this dynamic (of light appearing to slow when within a solid) is one of the fundamental facts underlying refraction—which means, based on the new metaphor, we may now comprehend a plausible underlying mechanics for that phenomenon too.¹⁰

But there's something more important. Einstein postulated that the speed of light is always constant *in a vacuum*. By this explanation of refraction, we are allowed to make a grander statement: The Speed of Light is Always Constant! With new metaphor in hand, we can see that it may *seem* to retard when an observer does not account for the nano-rumpled spacetime fabric through which it must travel when not in a vacuum. And of course the same applies in regard to its direction of travel. Basically, it always travels straight and with the standard speed through the particular spacetime it confronts. No exceptions. And, please don't overlook, this gives us a more universal rule—a not insignificant accomplishment.

With this view of light transmission in mind (having considered its behavior in transparent materials), we might consider why some materials are not transparent? Again, our general model makes the answer apparent. In the case of light transmission, it required a regularized handing off of the photon within a matrix, from one electron to the next, to achieve transparency. In other words, if the spacetime curve of one electron diverted a photon's path to the right, the next one had to divert it back to the left, and so on. Otherwise, there'd be little likelihood of the photon ever finding its way through the maze (particularly in anything *resembling* a straight line). That is the obvious key to transparency versus not. To be transparent, a material needs an internal spacetime structure that will at least make likely this kind of regular handing off (or, to put it another way, curving back and forth in the photon's path). Otherwise, its path is more likely to curve unpredictably, until eventually it's trapped in the orbit of some particular electron's slope (i.e., absorbed). If this happens more often than not to oncoming photons, it will of course result in a substance being opaque.

Now let's consider partial reflection (as involved, for example, when some light reflects off your kitchen window and some penetrates through). As it happens, this is one of the major topics in Quantum Electrodynamics, a field where in one of the more impressive feats of the last century pioneers developed an ingenious mathematics to predict the particular percentage of light that will reflect, depending on certain variables. Interestingly, even with this accomplishment there is frank admission that no comprehension exists for an underlying mechanics to explain why things happen as they do.¹¹

Turning to the topic directly, we know the ratio between reflection and transmission varies as a function of four factors: wave-length of the light involved, angle-of-incidence, type of material and material thickness. In regard to the last, most remarkably, the ratio varies in cycles up and down, with precisely the same values each cycle, as thickness increases. Indeed, if we were to test panes of increasing thickness and demonstrate, thereby, that a given cycle would complete with a change in thickness from, say, one micron to one millimeter, we'd find the same cycle repeated as we tested panes ranging from 1.0000001 meters to 1.001 meters (and from 99.0000001 meters to 100.001 meters, and so on). Why is this? Why does a photon care about (and how does it calculate) the thickness of glass when deciding on what percentage of incidents to reflect versus transmit?

Think again of the nano-rumpled spacetime within a pane of glass, as described in our new metaphor. Then pretend again that I'm a photon, hurtling toward that pane (which consists obviously of many

¹⁰Again, it's expected that this imagery is excessively simplified. I've made the models sufficiently detailed to illustrate principle, but no more so. A fully accurate, real-world-descriptive model would likely be significantly more complex.

¹¹"[W]e have no satisfactory mechanism to explain even the simplest of phenomena." Feynman (1985).

protons and electrons). With conventional metaphoric thinking we'd concentrate on the image of many pinpoint-like objects spaced at relatively large distances apart, making for mostly empty space between. With the new metaphor, there is no truly empty space. Certainly, there is the same space between *cores* of protons and electrons that is conventionally imagined, but under the new metaphor cores are not our full subject. We are just as (if not more) interested in their peripheral portions—and those positively fill the matrix, to such an extent that any particular point within must be involved with literally billions of overlapping peripheral slope structures. Thus, with the new metaphor we conceive a very disturbed spacetime matrix as induced by all the interlinking hands (so to speak) of the many *extended* spacetime structures within our pane of glass.

With this view in mind, let us ask: when I as a speeding photon come ramming at the speed of light into this conglomeration of many overlapping spacetime slopes: are they likely to themselves remain stagnant? At the very least, might I not expect them to quiver, something like, perhaps, a bowl of Jello?

The answer is obvious. And, significantly, as I strike the spacetime slope of one electron and it quivers, might I not expect it to jostle the slope of its next neighbor down the line, and so on—until, on the basis of my initial impact, the last electron on the opposite side of the pane finally has its spacetime peripheral slope jostled too? Of course, this one doesn't have a down-stream neighbor's slope-structure to jostle against. Thus, its reaction (in terms of how it jostles) must be different (absent that particular feedback) from all its upstream siblings. And because its reaction is different, it jostles back against its upstream neighbor in a different manner than all had formerly done up the line. And, predictably, this "mirrored" reaction (mirrored in the sense that it is essentially communication that's returned from the back side of the glass) must get transmitted, one spacetime slope structure to the next, all the way back to the front.¹²

So consider again that I'm that photon. I might on the one hand do a nice left-right-left-right hand-off, from one electron to the next, transiting nicely through the matrix. On the other hand, I might happen on a path that strikes some particular electron's slope at such angle and depth as to produce more than a slight bend and hand-off. Instead, the slope and my angle of incidence might be such as to swing my path quite around, ultimately pointing me back at an angle opposite from whence I came (producing, in other words, reflection). Depending on the particular matrix involved, it might seem a matter of chance, regulated by some probability level that must in itself vary depending on characteristics in the matrix, whether I strike such a path as this or one that leads to the hand-off routine.

Thinking slightly further, it's obvious that if the whole matrix is one that quivers in response to my initial strike, the quivering in itself becomes an element of the structure I confront. More specifically, there

¹²Note in this and other areas I may appear to be violating one of the primary tenets in quantum mechanics. Long ago physics surrendered to the conclusion that all at the sub-atomic level must be quantum, grainy, made of non-continuous, unsmooth lumps. Yet I am committing the heresy of again postulating a smooth and, more or less, continuous reality in this minute world. Indeed, my imagery (here in reference to inter-slope jostling among electrons), is of action that, if you could somehow cut out just a segment of it (i.e., a portion of what's diffused throughout the jostling), that portion would amount to less than a photon in magnitude. Indeed, if such were possible, we might cut out pieces in varying sizes, violating quantum rules disastrously. But this is not possible. There is no conceivable way to *introduce* such diffuse jostling by using anything less than a "particle." Nor, if the assumptions of my model are accepted, is there any conceivable method for *harvesting* that jostling action, except by noting its probability-rules-guided effect on the trajectory of particles which pass through it. To analogize, it is true, on the one hand, that the water through which my oar moves is a smooth and continuous material. However, I cannot possibly generate a half (or a third or a fourth or a fifth) of an eddy via its disruption. I can only generate a whole. Thus, *so far as those little eddies are concerned*, it follows that my oar may only be involved in quantum activity. Similarly, in the case of spacetime and its small actors, we must likewise do commerce in the quantum. However, it does not follow that we may not infer a smooth matrix in which those actors work.

must be some *time* element involved as the jostling from my initial strike transmits from one electron to the next, all the way to the rear, then back again. Indeed, we may conveniently think of this reaction as a wave traveling through the materials spacetime matrix. With that stated, consider where am I, within the matrix, when the wave (as induced by my initial impact) comes back to greet me? Surely, any wave will make subtle changes in the matrix's geometry, particularly at the location where it happens to be when I also meet it. Fittingly, my tendency to be swung around (versus handed off from one spacetime curve to the next) will vary, depending on such local geometry. As comedians are wont to say: "Timing is everything."

Given this, it's unsurprising that rates of reflectivity vary—and in cycles—with thickness. Indeed, it would only surprise if they did not. The phenomenon would have been predicted, even without observation, on the basis of the one-rumpled-blanket thesis that is our metaphor. And while again we see this thesis providing a basis of explanation (an easy to conceptualize machinery, if you will), this is a case where previously there very little imagined in such regard.

Or perhaps I should say *consistently* imagined, for (and as mentioned in introduction) the metaphors of particle and wave have alternatively provided serviceable though inconsistent utility. It's significant in this regard that what I have now postulated (in connection with partial reflection) offers a chance to conceptually have it both ways. Essentially, light remains completely a quantum character (though a twisting, somewhat amorphous disturbance in spacetime rather than a little *dot* of something distinct from it)—with no exceptions. Even so, it gets some wave attributes purely from its own character (since rate and plane of rotation translate reasonably as wave-length and polarity). Other wave attributes arise because of genuine waves—though not ones that exist in a photon itself. Those exist and act within the spacetime matrix of the materials a photon confronts.^{13, 14}

We might lament that this explanation is slightly complex (postulating, as it does, *two different sources* for light's apparent wave characteristics), but consider the conundrum it answers, and how well it seems (at least to the extent it's roughly worked out here) to *fully* answer it!

Another illustration may be had via the famous two-slit experiment.

Again imagine that I'm a photon, this time hurtling toward the vicinity of two slits in a screen. A snapshot in time later, I'm through the screen, and on some trajectory that suggests there was wave interference as I passed through. This holds true though I was but a single photon, alone in my journey, and therefore cannot have reacted to the wave attributes of any other photon.

¹³At first blush you might think this wave would need to travel faster than standard light speed in order to dash ahead of me, bounce off the back side of the pane, then come back again to greet me (otherwise, it might seem, I'd be to the back side of the pane just as soon as it was). Remember, however, that *I've* effectively slowed down. Just as soon as I hit the matrix, I began that circuitous path. This matrix wave, on the other hand, presumably must travel straight and true, thus appropriately leaping ahead.

¹⁴In fact, the concept of a wave emanating through a material (when struck by a quantum actor) is already well-established, though in a somewhat different context than is involved in my description. Specifically, when a high energy particle moves through a material (such as water in the bath around a nuclear reactor, for example), it is known to send a spherical shock wave throughout the material. If the particle exceeds the *normal* speed of light (as reduced from its standard in-a-vacuum speed to what would normally be its speed within the material), the shock wave induces an occasional electron to give off a photon. The resulting glow is known as Cerenkov radiation.

For a long while physicists sought to determine which of the two slits a particular photon, subject to wave interference, had passed through. They failed always, but still have seemed to continue assuming any given photon must have passed through one slit or the other.

Why must we assume this?

Why not suppose, instead, that slits in the screen alter its spacetime topography, simply, in a manner that's sufficient to allow passage—as through any transparent material? In short, much as when passing through glass, suppose that I (as a photon that's made it through the screen) traversed its topography in a pinball-like fashion, and did not end up getting trapped in any electron's orbit. And, much as in transparent glass (where there's a quivering of the matrix from my impact), there was a quivering here too. But here it was not just opposite sides of glass that were involved in containing and reflecting. Here the quivering was affected, contained and reflected by the edges of those slits, producing something akin (perhaps) to a tuning-fork/like interaction between them. My own interaction with that phenomenon affected me in a manner that was probabilistically reflected in my own trajectory. Thus my particular path became a product of a very real wave interference—but (and most importantly) it was wave interference within the spacetime matrix *of the screen*.

This kind of thinking (particularly as combined with the concept of reflection as earlier discussed), immediately suggests a conceptual leap to the dynamics of a *diffraction grid*. Logically we'd expect there might be a “tuned” interaction between appropriately spaced “teeth on the comb,” in such a structure, when struck by the shockwave of a matched-frequency photon. We'd further suspect that slopes within the underlying structure could be bent by particularly-timed perturbations in the oscillating shockwave, precisely as needed to curve the photon's path (as viewed externally, of course) back outward and away from the grid. You'd simply expect such a phenomenon based on no more than thinking about the mechanics visualized here.

8. Smaller Quantum Actors?

During all this discussion I've paid scant attention to the fact we know each of the primary atomic actors (referring here to electrons and protons; neutrons, I have sadly ignored) are in turn composed of smaller “particles”—indeed there's a veritable zoo of such smaller, constituent actors, including gluons, quarks and bosons. Superficially, it might seem the reality of these smaller objects argues against the new metaphor, for I've described charged actors as, essentially unitary (and in a sense smooth) dimples in spacetime. How can it possibly fit, within my conception, to realize each smooth dimple is made of a definite number of smaller (and seemingly discrete) parts?

On its face, when realizing that such smaller “particles” are apparent constituents, it makes the metaphor seem inapt. However, let us imagine one of the little eddies of water that I've sometimes seen twirling off the blade of an oar as I trailed it in the water. Remember, that eddy is a quantum actor in the sense I cannot generally do commerce in half-eddies. I can't, in other words, generate a third or a fourth or a fifth of an eddy at the tip of my blade. It's either whole eddies or none.

But it's not hard to imagine, as I watch one such eddy go twirling away, it might be possible with just the right kind of violence to chop it into two or more smaller ones. Perhaps, with a slender knife slicing through the center of one, for example, I could essentially divide it and then see two much smaller eddies twisting independently. Indeed, there's an analogy in terrestrial storm systems, where it's not uncommon to develop what is called a “cut-off low.” Essentially, some part of one twirling mass becomes cut-off from the rest, and becomes its own independent twirling mass.

It further seems apparent that if I were to study the characteristics of my little water eddies, I'd be able to discover and apply certain mathematical values in their regard. And if I became practiced at splitting naturally-sized eddies into smaller ones, I'd find further mathematical values and relationships coming into play. Indeed, it seems I'd eventually find I could mathematically predict that sub-eddies, having certain mathematical values, should be observable when a larger eddy was subjected to certain kinds of violence.

If this imagery is apt, it would mean that in their effort to find particles more basic and fundamental than the basic atomic constituents of electron and proton, quantum physicists have been looking somewhat afield—which hardly seems likely given their collective brilliance. But it does somewhat fit the circumstance, for rather than finding increased simplicity at a supposedly more basic level (as is normally expected), they have instead found increasing complexity amid an ever-growing menagerie of actors—a result that is predicted by this imagery and yet is embarrassing to standard metaphors.

Of course, even assuming this new metaphor is superior, there remains a genuine merit in determining the kinds of smaller eddies primary ones might be divided into. It's just that, with the new metaphor, a rather different light is shed on the enterprise.

9. Gravity

This is not a favorite topic for quantum physicists. Even mathematically, they have as yet been unable to incorporate both it and quantum mechanics into a single framework. Yet, having found in their own field that everything is ultimately made of individual actors (another way of saying small stuff is, ultimately, grainy), they've yearned to prove the same in regard gravity. To date, they've failed.

Having no expertise in the mathematics involved, I must plead ignorance on that issue. In regard to conceptually describing an underlying mechanical relationship between the two worlds, however, it's hard to deny this new metaphor all but automatically bridges the gap. It does so by virtue of its underlying character. Essentially, it assumes nothing but the same kind of density variations that are gravity, but on a tighter scale, and following particular patterns that may logically account for what's observed.

In particular regard to gravity, however, we should briefly continue our thought-experiment, considering what particular spacetime dynamics, among a conglomeration of many electrons and protons, might account for the much broader-scale spacetime deformations that are gravity.

To begin, we'll remind ourselves that gravity results from mass—which raises the question: How do we account for mass (i.e., explain or describe it) in terms of the new metaphor?

While other proposals may be made, the simplest may be to assume it is in consequence of (or, perhaps stated better, is the fact of) a density surplus when a charge-structure's core is netted against its periphery. Stated differently, we may conceive that when a proton's rarified core is balanced against its dense periphery, the result tips somewhat on the side of density (particularly as compared against ambient, non object-filled spacetime). Thus, each proton achieves a small density surplus. In regard to electrons, since we're told by researchers they have some but an extraordinarily minimal mass, we'll logically conclude their density core spike is *almost* perfectly balanced by their vacuous periphery (though not quite, which allows them the slightest surplus of density, and hence mass).

Continuing the metaphor, imagine what might logically occur when you assemble a bunch of both structures together. In other words, we'll create a region of spacetime that contains many quintillions of

each. What happens? Obviously, we'll end up with a substantial, accumulated surplus of spacetime density in that area—and the more protons and electrons we gather, the greater the surplus will be.¹⁵

So now we've got a big density surplus, all gathered in one spacetime region. Does anything further happen? It seems logical to think this density surplus would push outward, against surrounding spacetime, densifying as it pushes. It further seems logical to suppose this densifying effect might transmit along considerable spacetime distances, though of course decreasing geometrically with distance. This obviously describes a large-in-scale spacetime slope. In short, it describes gravity.

10. Inertia

How might our metaphor potentially be used to describe the mechanics of inertia? Asked differently, how might spacetime deformations explain an underlying *cause* for the fact that objects tend to maintain their state of motion?

If even the general theme is apt, it seems reasonable to suppose moving actors might push on and thus densify spacetime in the nano-region immediately forward of movement, while leaving an aft region comparatively rarified. Thus, a moving actor might induce a spacetime slope, with itself in the middle. Significantly, such a slope would tend toward greater density in the forward vector. Since objects with mass are impelled in the vector favoring greater density, it follows that would be the very direction of impetus for any such object (at least if such a slope existed).

But the concept is broader. Conventional relativity teaches that all motion is relative. Significantly, so is spacetime itself. This becomes more obvious when we remember that the moving spacetime slope, as just imagined (enclosing a moving actor), exists only from a bystander's perspective. From the perspective of the actor inside, there is no slope, or movement either. Indeed, from *its* perspective, the actor is maintaining constant position within flat space—a perspective that allows us to do Newton one better and postulate that (in respect to spacetime, at least) all objects tend to maintain a state of rest.

No doubt, this insight is *implicit* in conventional postulates of relativity. What's important to note here is how beautifully the expedient of our metaphor paves the way toward a more robust comprehension. Absent supposing that spacetime so easily deforms within nano-regions (so easily as to allow a moving object to reside within its own spacetime slope), it's all but impossible to comprehend (at least in so satisfying a manner) just how thoroughly relativity rules.

Indeed (and as another insight), consider Lorentzian contraction and the increase in mass as objects approach the speed of light. Such brain teasers are much easier to fathom when we suppose that, from the perspective of a stationary observer, moving objects must be enveloped in an (increasingly severe with speed) spacetime slope. In this view, it's easy to comprehend why funny things should happen to mass and length (again, as perceived from a "stationary" perspective). It also leads to an intuitive grasp as to why there must be an absolute limit on relative speed (and why, indeed, that is the only *kind* of "speed" that's even relevant).

¹⁵A budget clerk might suggest dispensing with the cost of electrons in our assemblage, since they do so little to contribute to mass. It would be a fine idea, except that absent their electron companions, protons would stoutly refuse to gather in anything approaching the large numbers that make gravity possible (consider all those repelling slopes). For any possibility of such a gathering, there is no choice but to encase each small aggregation of fused protons within an opposite-slope shell (i.e., electron-provided). Because of the undulating topography that results, there are then plenty of spaces where truly great numbers of protons can aggregate (summing their masses). How interesting that we *have* to include the almost mass-less electrons to make that happen.

11. Does This Perspective Offer Novel Predictions?

To convincingly demonstrate usefulness, it's most helpful if a new perspective can predict phenomena that have not been observed, following which experiments are conducted to see if, in fact, the predictions prove accurate. Of course, the predictive implications of a perspective are not always obvious; some may exist that even its inventor has not realized.

Regardless, I have thought long and hard in the effort to conceive of phenomena as implied by this perspective that are presently unknown, and potentially subject to testing. A few times, I've momentarily thought I'd come up with a solid candidate, but generally (and at least to date) I've discovered the predicted phenomenon was already known.

As an example, early on I realized this perspective implicitly predicts that an ordinary macro-charge field (such as that surrounding a statically-charged rubber comb) should bend light. Obviously, it doesn't happen perceptibly at that level, but my general perspective predicted there should be minute bending regardless. It further predicted that if you created a much more intense field (perhaps, for example, if you assembled two large plane surfaces, placed them parallel and very near, and charged them to high and opposite voltages, thereby creating an intense charge slope between), and if you then shined a laser within and along the resulting charge slope, there should be a measurable diversion in its path (at least if the testing apparatus was sufficiently sensitive to detect it). I actually tried a crude approximation of this, using a Van de Graaf generator. It didn't work, but the point was moot for I soon discovered the effect had been predicted on another basis and, indeed, had already been experimentally verified.¹⁶

The one exception from my failure to novelly predict is not impressive, but is real. Implicitly, the new metaphor predicts that physicists will forever fail in their quest to find graininess in gravity. As of present writing, this prediction has withstood the test of some ten years (during which time a legion of physicists has been dedicated, though unwittingly, to precisely its disproof). The downside, of course, is any person among that legion may succeed at any moment—which is what makes my conditionally successful prediction less than exhilarating (but then again, how many physicists were predicting 10 years ago that gravitons would still elude them after this much time?).

Regardless, simply because I have failed to invent and execute an experiment that is both novel and conclusive (though the one above-described one might at any moment prove conclusively negative), does not mean others will similarly fail. By its nature, the new metaphor is pregnant with predictive power, suffering only from the debility that most every prediction I've personally managed involves already observed phenomena. I feel confident others can do better.

I must also add that, novel predictions or not, it is a significant accomplishment to remove the previous exceptions that were granted to light in regard to its speed constant and direction of travel. That achievement alone commends this method—particularly because there is no other apparent path by which the speed and direction of light may be interpreted as always constant except by concluding that the spacetime interior of a refractive material is nano-rumpled.

Indeed, I have described a kind of “super relativity.” Special relativity was awesome. General relativity is better still. I submit that the thoroughly comprehensive relativity, as described here, is (quite simply) the next logical step.

¹⁶ See Forward (1989) and Freedman (1998)

12. Conclusions

On the basis of using a single, previously unexplored metaphoric method (describing subatomic actors as particular kinds of spacetime density variation), I've found it possible to imagine specific structures that, as modeled and with minimal assumption, provide a conceptually plausible and satisfying mechanical explanation for many major phenomena. This is achieved with one lattice, one framework, one material only—and with but one ultimate “force” (the tendency of any “wrinkle” in spacetime to move within a slope toward the direction more closely approaching its own density). I've found this one lattice ties many phenomena together under a single, simple and common theme of explanation.

To the best of my knowledge, no one has previously thought to use this single spacetime theme in the effort to describe and model so much. Perhaps no one thought such a simple framework could be modeled in such manner as to simultaneously account for (and mechanically explain) so many different things. I've shown the metaphor is incredibly adept.

What's more, I've found this metaphor absolves light of the exceptions it had previously seemed to grant in regard to constancy in its speed and direction of travel. With the new metaphor, we are allowed to conclude there are no exceptions: light's speed and direction are *always* constant.

But have I discovered anything materially new? Do my insights predict any previously un-encountered experimental results? The answers here are qualified. It may be that all the relevant observational facts have already been unearthed—but I doubt it. I suspect that what's been needed is a better metaphoric basis with which to conceptually model things, and that with the basis as here provided new predictions will unfold.

Have I considered application of the metaphor to all phenomena? Obviously not! In particular, I've given no consideration to neutrons, the weak force, antimatter or dark matter. I've also not explored how any of these concepts might apply mathematically. To be so thorough has not been my purpose. I have wanted, simply, to report on potential effectiveness of the metaphoric theme in regard to the particular areas analyzed.

Are there elements of understanding, not known to me (particularly those involved with more arcane levels of physics), that would prove this metaphor is ultimately inapt? Based merely on abstract principles, there's a very good chance the answer is yes, for there is much I don't know, and overall the odds of a less-than-very-well-versed outsider making even a small contribution to physics (much less a significant one) is remote in the extreme.

I *have* endeavored to learn, from those well-versed, if they see any direct bases by which to condemn the themes here discussed. This is a difficult enterprise because, most reasonably, those in the credentialed community seek to resist wasting time on crackpots (which I absolutely appear to be). Nonetheless, a very few have been kind enough to spend some time with me. Based on this, I've learned of some considerations that might potentially unravel everything here discussed. I am anxious to explore those in greater detail. At earliest opportunity, I'll add a section here, explaining those matters.

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