

# Introduction to Space Lattice Theory

## Elements for a Grand Unification of Physics

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**ABSTRACT:** Space Lattice Theory is a theoretical study of the fundamental structure of the universe. The study asks what the structure of space might be like if, instead of being mostly an empty void, space is a densely packed, crystal-like Lattice. In this Lattice, the existence and interaction of what we call matter is due to movable defects or dislocations in the Lattice similar to those observed in metals and semi-conductors.

The study found that a dislocation model could produce a comprehensive set of simple, visualizable explanations for most of the concepts of physics, including many that are currently highly speculative. It suggests conventional physics explanations for matter, time, cause and effect, energy, and how energy converts to matter. It suggests structures for gravity, electric, and magnetic fields, how they can be physical realities, and how they could function. It suggests classical foundations for relativistic observations.

Space Lattice Theory supports a “big bang”-like beginning for a 3-D “visible” universe, suggesting how it could easily emerge from what appears to be the nothingness of space, but without having to change any classical laws of physics. Solutions to puzzles like the particle-wave nature of photons are suggested. Problems with current standard model theories for subatomic particles, cosmology and Special Relativity are discussed and partial solutions suggested. New models supporting the suggestions are proposed.

Most significantly, Space Lattice Theory suggests a comprehensive model for the Grand Unification of all forces and matter in the universe.

### ***The Inspiration***

In 2004, the 100<sup>th</sup> anniversary of Einstein’s Special Relativity paper, I was reading an article that reviewed Einstein’s idea that gravity could be visualized as a fabric in space. Einstein suggested that a mass in space could be visualized as a “knot” in the fabric. An alternate concept appeared in my mind based on my experience with metals and electronic semiconductors.

Electric current is well established as the “flow” of electrons. But on the atomic scale, in order for a line of electrons to move through a conductor, a number of intermediate steps must occur.

First, the structure of the conductor must have atoms with missing electrons (valences). Second, an electric field must be established to apply a force to the electrons. Once the field exists, an electron somewhere in the field which is adjacent to an atom that is missing an electron, jumps from its current location to fill the valence. This creates a new valence in the atom it came from. Another adjacent atom with an available electron, supplies that electron to fill that valence, in turn creating another missing space. From a distance, this would look like a bucket brigade. The process continues until all the electrons along a path through the electric field move one atomic spacing.

Over all, a large quantity of electrons have each moved a single atomic step. But, from the standpoint of the “conductor” as a whole, it appears that a single electron jumped in one end of the conductor and another electron jumped out of the opposite end. As a more detailed model, the missing volume of the first valence to be filled, which started the whole cascade, can be viewed as a positive charge moving in a direction opposite to the electron motion. In electronics, this “theoretical” positive charge is called a “hole”.

But, more importantly, what is really a non-entity, a single “hole”, appears to move all the way from a positive terminal, at one end of the conductor, to a negative terminal at the other end of the conductor, while the electrons which are the actual carries of electric charge each only move **one** atom spacing in the other direction.

Metals also experience a similar phenomenon. It is well known that metals are much weaker under tension or shear than would be predicted from atomic bond strength for a perfect crystal. The low strength property of non-single crystal metals was explained in detail by Volterra in 1907. The term dislocations was established by Taylor in 1934. In a typical polycrystalline metal, the interface of adjacent crystals do not exactly match. Areas of mismatch are called dislocations. When stress is applied to the bulk material, the atoms near crystal contact points experience plastic flow realignment. As in the electronic example, the dislocations don’t move simultaneously as in a chain, but like a bucket brigade across the whole length of the crystal face. The moving dislocations act like a lubricant for part of the crystal making metals much weaker than a single crystal.

What occurred to me was that Einstein’s “knots” in a **fabric** of gravity, might in fact be “holes” or “dislocations” in a 3-D universal lattice. Without knowing where this would lead, I started to explore how such dislocations would have to work to explain the basic elements of physics. Some concepts, like simple atomic particles moving in a Lattice initially seemed quite simple. But addressing specifics like photons introduced challenging complications. The dynamics and geometric challenges, however, were pretty narrowly bounded, creating the enticement to go one more step. The solutions required a lot of geometric modeling. The reason I continued the effort was that, **solving** each difficult relationship, **new** and **simple** concepts emerged for some tough questions in physics – like photons. This carrot-on-a-stick kept me going for over two years. The result was outstanding.

In summary, the reason I now continue to share these discoveries is that they provide SO MANY potentially new approaches to answer the MAJOR questions of physics while being consistent with many well accepted experimental and theoretical observations.

## ***Space Lattice Theory***

### **The Aa**

- The basic constituent of the universe is a very small object which I call an Aa. I have no evidence for the specific shape of an Aa. But after attempting to construct a lattice from different forms, taking into account both static and dynamic properties, the simplest form that appears to work may be visualized as a dumbbell with two spherical ends.
- The Aa is **unique**. It only occurs in one form and everything we observe in the universe is explained by it.
- Space is completely filled with Aas. They act as if they are under great compression, like a fluid pressure.
- The Aas contact each other at their ends, creating a “lattice” that fills a conventional 3-dimensional space. The Aas join most strongly at their ends tending to form 3-D webs. They may, at times, also join at their sides. There is no physical “node” or mass at the connection of the Aas.
- The space lattice has local structure like that of a single crystal but is amorphous on the scale we associate with visible mass ( grains of sand, planets, stars, galaxies ).

- An Aa doesn't exhibit conventional mass properties, or at least not the Newtonian mass properties we observe. An Aa may have elasticity and inertia. The Aas interact completely without friction.
- Some peculiarity at the sides and ends of the Aas only allow them to join at preferred angles. This is similar to and may help explain the bond angles we observe at the atomic scale. Force occurs as the contact angles bend due to the universal fluid pressure. Force also occurs if an Aa is compressed either axially or laterally. Aas may be much longer than they are wide, which may lead to bending properties.

Why am I so excited by this model? Because the principles in this model can describe so many things we observe in the universe in such profoundly simple and practical forms - some which have never been logically explained in any other way.

## Matter and Mass

Mass, or more specifically, any fundamental particle we observe, is **created** in space by the occurrence of a structural dislocation in the space lattice. This appears as a local removal or addition of an Aa. Specifically, **mass is a local dislocation in the framework of space**. **Matter** is probably due to a defect caused by a missing Aa rather than an added Aa.

## Antimatter

Antimatter can be explained by the construction of dislocations that cancel when they collide. For example, a dislocation characterized by a missing Aa defect ( Matter ) could be annihilated by a dislocation characterized by a surplus Aa defect ( Antimatter ). The annihilation would produce substantial energy, and ONLY energy.

## Matter – Energy Transformation

- THE CREATION OF MATTER OUT OF NOTHING ( the BIG BANG ) is easily handled by this theory. A buildup of stress in the space lattice that can rend a void in the lattice ( a universal earthquake ) would create the equivalent of the big bang. Aas would break off the edges and fall into the void. Matter would be created as the void collapsed and Aas were trapped in distorted arrangements. There would not necessarily be the creation of an equal amount of antimatter ( which is what we observe ) because a void is essentially a net absence of Aas.
- This model also answers another major question: how can matter expand out of a big bang singularity, which is essentially a major black hole? The Aas model suggests that the space lattice was deformed by some event to form a large void. It was never a singularity. Until this void closes up, the lattice field shape, which is actually the shape of gravity around the void appears as an antigravity field. This will propel mass outward.
- THE DESTRUCTION OF MATTER INTO NOTHING is explained by this theory. This is the role and fate of BLACK HOLES. As particles, which are structured dislocations, fall into a Black Hole, they are essentially converted to pure lattice. A particle is a structure that is deficient in Aas. As particles fall into the black hole, they are disassociated to fundamental particles and Aas from one particle combine to fill the void in another particle producing lattice. The increase in lattice reduces the bending in the lattice field, thereby reducing the effective gravity of the Black Hole. Ironically, while initially formed as a concentration of mass, additional mass will just reduce the mass effect already there. A Black Hole could become just a steady state mass eater. Or, if there are dynamic instabilities, it could form, loose it's critical mass, and then break up into smaller entities.
- PARTICLES are formed by different configurations of dislocations. An infinite number of particle types can be created by causing more varieties of dislocations. (This would explain why we keep

getting more particle types with stronger particle accelerators.) Only specific arrangements, however, are stable due to the joining angle restrictions of the Aa. The physics of how the Aas attach at their sides and ends govern particle stability.

- Particles move by the propagation of dislocations, or movement of collections of dislocations in the lattice. A propagating dislocation may be compared to a “hole” moving in a semiconductor.
- Particles can change form by rearranging their dislocations.
- FORCE AT A DISTANCE, one of the greatest puzzles in all physics, is explained by this theory. A VACUUM, on the macro scale, does not actually produce a suction force. The force we observe is caused by a PRESSURE which is not equally opposed. According to this model, the same process is occurring in the universe. The universal lattice is under pressure, and due to the shape of the Aas, may exhibit many forms of local stress. As mass is created by dislocations, the shape of the lattice in the area around the mass changes. As masses come together, the overall lattice shape is further distorted. In summary, masses are pushed together by the pressures of a warped lattice; they are not pulled together by some attractive means. Force occurs at a distance because the lattice is continuous and is bent by the presence of objects, i.e. defects.
- GRAVITY IS THE CUMULATIVE WARPING OF THE UNIVERSAL LATTICE DUE TO THE PRESENCE OF DISLOCATIONS. Each dislocation (mass ) warps the structure of the universal lattice. This produces Einstein’s view of gravitation as a warped field in space. Aa theory also suggests, however, that gravity is limited, because the bending of the lattice is limited. Gravity can be locally overcome by introducing a void in the lattice and straightening the field.
- ATOMS are collections of particles, and therefore, collections of dislocations. The collection of dislocations can move as a group. In this case, outer structures ( electrons ) interact most strongly with the lattice and other atoms as the group moves through the lattice.
- The phenomenon we refer to as ELECTROMAGNETIC WAVES, is actually multiple distinct phenomenon. Photons, which have the ability to alter particle structure, are fundamentally different from radio waves, which can only cause the motion of electrons. Visible light may mark the crossover from radio waves to photons.
- PHOTONS are COMPRESSIONAL VIBRATIONS in the lattice. (This is a dynamic aether model. The lattice is the aether.) They are created by a change in the dislocation structure of a particle which actually removes a single element dislocation from the structure. The change removes mass from the particle. The change launches a compression vibration into the universal lattice. The vibration propagates, without spreading and without  $1/r^2$  loss through the lattice until it interacts with another particle in a way that it can add a single element dislocation to another particle, at which time the photon disappears. Mass is added to the new particle. The energy acts as a packet and is quantized. The propagating wave has a finite geometry, thereby exhibiting particle like properties. The wave does not stop until it creates another dislocation. Therefore, a photon can not come to rest. The photon, however, is not a wave. It does not have a wavelength. It’s wave related nature only occurs when it interacts with matter.
- Light bends in a gravity field because it propagates along the structure of the lattice which is bent by gravity.
- RADIO WAVES are TRANSVERSE VIBRATIONS in the lattice (including torsional vibrations). They spread geometrically, are subject to  $1/r^2$  loss, and can dissipate to zero amplitude without a quantization limit. Radio waves are traditional waves. The lattice is the aether.
- The passage of any vibration through the lattice produces bending in the lattice. The higher the energy of a photon or radio wave, the larger the associated bending in the lattice as the wave passes. The passage of a vibration through the lattice responds to distortions existing in the lattice which results in wavelike behavior. The passing vibration also follows the warping in space, thereby exhibiting relativistic mass properties.

- CONSERVATION OF ENERGY is retained. Energy is the amplitude of a photon in the lattice. Mass is a dislocation. Mass converts to energy by the collapse of a dislocation. Energy converts to mass by the generation of dislocations. Only allowed forms of dislocation can become stable masses.
- QUANTUM MECHANICS is related to the fundamental properties of the lattice elements. The smallest quantum is related to the simplest dislocation.
- REFRACTIVE INDEX: The space lattice fills the intervening volume between the fundamental particles in the atom and between atoms. The structure of the lattice is “regularly amorphous”. This means it has a structure that is intimately dependent on the atoms surrounding it. The increased disorder of the lattice requires photons to take circuitous paths, decreasing propagation speeds. It also suggests how photons can resume their speed as they emerge from matter. They just enter a more streamlined lattice.
- EINSTEIN: The Special Theory is out. Light propagation becomes “Newtonian”. The General Theory is supported in that the gravitational field is now physically explained. Einstein’s thought that mass could be “knots” in the fabric of space was actually pretty close to this. But knots in a net don’t move. In the form of dislocations, they can move.
- MICHAELSON – MORLEY / DAYTON MILLER: The space lattice is the aether. The shape of the space lattice produces gravity. Space lattice defects are mass. The lattice is dynamically interactive with all collections of mass. As the earth moves through the lattice, the parts of the lattice nearest the earth must interact with the mass structures there. The lattice essentially forms a boundary layer which moves along with the planet. There is a very small drift near the planet ( Michelson – Morley ) which can increase substantially with distance from the surface (Dayton Miller).

The complete Space Lattice Theory paper is available from:

Academia [https://www.academia.edu/12080870/Space\\_Lattice\\_Theory](https://www.academia.edu/12080870/Space_Lattice_Theory)

General Science Journal: <http://gsjournal.net/Science-Journals/Research%20Papers-Unification%20Theories/Download/6034>

From the A3 Society –

An Abstract - <http://www.a3society.org/Documents/SLT-Abstract.pdf>

A short 6 page overview (this paper) - <http://www.a3society.org/Documents/SLT-Overview.pdf>

An introduction to SLT - <http://www.a3society.org/Documents/SLT-Introduction.pdf> 3/16/2015 75 pages including 18 figures, glossary and references

The full paper [http://www.a3society.org/Documents/Space\\_Lattice\\_Theory\\_Nappi\\_2015.pdf](http://www.a3society.org/Documents/Space_Lattice_Theory_Nappi_2015.pdf) 3/16/2015 244 pages 30 figures

An abridged version for general audiences is available at <http://www.a3society.org/LatticeTheory>

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