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Extended Abstract

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Dimensional model for predicting particle physics

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Just as energy and matter are the same things, space and energy are the same things. This conclusion requires a different view of atomic structure and a very specific mathematical model. Algorithm Universe Theory (AUT) defines the structure of not just atomic structure but the underlying spatial matrix and re-defines time as an effect of the building of the matrix like force, dimension itself and the source and effects of Quantum Mechanics and the origin of space-time from a non-dimensional matrix. Algorithm Universe Theory (AUT defines the source and effects of Quantum Mechanics and the origin of space-time from a non-dimensional matrix. A mathematical model for generating dimensional features in two equations is presented: 1. Non-dimensional changes occur as the generation of data points: ([-1^x plus 2x(-1)^x-1]) as x varies from 1 to infinity for points generated with a new starting value of x with one new point generated for each change in x aligned by solution order; each point has a fuse counted down by the same counter upon completion of such fuse shifts the point to the next higher state, e.g. -3 shifts to 5 after 3 changes in x, 5 changes to -7 after 5 changes in x with all points changing according to a single variable so that the universe of data points exists in quantum moments of increasingly larger amounts of information; 2. Dimensional Changes use the data to increase n as the limit of prior, lower intervening solutions approaches 1 for 2f(n)^2^n points having alternating positive and negative values with intervening transitional states, such as the proton and electron for n=4 without full compression which would result in a neutron. The interaction of the two derivation equations (both derived sequentially from -1^n), gives rise to results for observed dimensional features such as force, dimension and time using a single variable. Space becomes the densest substance resulting from the math and all other dimensional forms are derived from folding space mathematically.

The manipulation of biological cells and micrometer-scale particles using dielectrophoresis (DEP) is an indispensable technique for lab-on-a-chip systems for many biological and colloidal science applications. However, existing models, including the dipole model and numerical simulations based on Maxwell stress tensor (MST), cannot achieve high accuracy and high computation efficiency at the same time. The dipole model is widely used and provides adequate predictions on the crossover frequency of submicron particles, but cannot predict the crossover frequency for larger particles accurately; on the other hand, the MST method offers high accuracy for a wide variety of particle sizes and shapes, but is time-consuming and may lack predictive understanding of the interplay between key parameters. Here we present a mathematical model, using dimensional analysis and the Buckingham pi theorem, that permits high accuracy and efficiency in predicting the crossover frequency of spherical particles. The curve fitting and calculation are performed using commercial packages OriginLab and MATLAB, respectively. In addition, through this model we also can predict the conditions in which no crossover frequency exists. Also, we propose a pair of dimensionless parameters, forming a functional relation, that provide physical insights into the dependency of the crossover frequency on five key parameters. The model is verified under several scenarios using comprehensive MST simulations by COMSOL Multiphysics software (COMSOL, Inc.) and some published experimental data. In ancient times, Greeks interested in forecasting the future would voyage on the seventh day of the month to the Temple of Apollo in Delphi to seek insight from the oracle. Today, we don't need to decipher the riddles of a high priestess; scientists build mathematical models that predict everything from the economy to the weather.

One particularly powerful mathematical prophet is the Standard Model of particle physics. It produces sharp predictions about the subatomic world.

"The Standard Model is a collection of ideas that tells us about nature and how all the particles in the universe interact with each other," says Tulika Bose, a physics professor at the University of Wisconsin. The Standard Model describes the behavior of the smallest building blocks we know: six types of quarks, six types of leptons, three fundamental forces (and their four associated particles), plus the Higgs boson. Like the soothsayers of antiquity, the Standard Model speaks in riddles that only trained practitioners can interpret. But unlike Pythia of Apollo, the Standard Model is an amalgamation based on the work of thousands of independent scientists, and its predictions have weathered decades of experimental testing. Theoretical physicists are working on a theory that goes beyond the Standard Model of particle physics. The central element is an extra dimension in spacetime. Until now, the scientists have faced the problem that the predictions of their theory could not be tested experimentally.

Bottom Note: *This work is partly presented at 4th International Conference on Astrophysics and Particle Physics*, December 03-05, 2018, Chicago, USA