Greek Natural Philosophy 300BC–2022AD Resolved: Particles are Fields

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Greek atomist particle physicists get all the press while the Greek theory of forms has formed quantum information field theory.

1. The Results Are In

Experimental Physicist Maria Spiropulu in the APS April Meeting 2014 compared the 'Quantum Crisis' in elementary particle physics to the classical mechanics crisis of 1905:

> "Without supersymmetry, we don't understand how the Higgs boson can exist without violating basic mechanisms of quantum physics. ... Either the new run of the LHC should discover superpartners, or radical new ideas are needed." [1]

Hence Prof. Spiropulu sees the need for a radical new vision:

> "Indeed, the study of the most fundamental constituents of matter and energy may be entities beyond elementary particles as formulated so far, so we want to explore this, too." [2]

Recently, at the QNetworks April meeting 2022, Prof. Spiropulu gave a talk on her Quantum Teleportation Networks [3] after which the author was fortunate enough to ask:

> "Is quantum teleportation considered by most physicists based on some multi-body particle material mechanism or immaterial quantum information basis?"
> Prof. Spiropulu: "Perhaps it does not have to be either/or." [4]

Quantum teleportation, as we see it, is occurring exclusively on a quantum information basis. So this vision paper starts from the first principle the LHC is entirely energized by the 4D spacetime Einstein-Maxwell electromagnetic stress-energy momentum density pressure tensor and its ATLAS CMS detectors measure only 4D electromagnetic energy density tensor pressure quantum field information.

The present radical new idea computationally reproduces QED 0D→4D spatially-extended photon-electron soliton gauge group observables to all 31 & 34 decimal places for all wavelengths and energy levels [5] via

Schwinger local field operator Dirac-Einstein-Maxwell gravitoelectro-magnetic stress-energy momentum *computationally dualistic* energy-mass density pressure tensor field integrations. Measurable along Feynman path integrals Noether probability current ranging compressive through rarefactive of the cosmological constant vacuum energy momentum density pressure Λ spanning all the factors in the relativistic energy equation in all cases greater than zero energy-mass gap.

2. Singular Complex System Conjecture (SCSC)

The radical idea is based on the conjecture there exists a singular mathematically possible universal complex system of the 4D spacetime dimensions, physical constants, laws, holographically bound energy-mass density distribution with time the fourth dimension of length from $t_{-\infty} \to t_{\infty}$ with the unitary factors in Euler's identity $e^{i\pi} + 1 = 0$ composed via the concept of infinity with no free parameters [6].

Improbably, SCSC can never be proven via its internal axioms per Gödel incompleteness only falsified by proof of the Mathematical Universe Hypothesis (MUH) unformalized claim external physical reality is the mathematical structure of a computable universe having parallel universe variations of physical dimensions, constants, and laws [7].

Problem is proof of MUH requires formalizing the unknown parallel universe variations of the Supersymmetry ($SUSY$) particle model all of which are zero-sized (0D) Dirac delta functional δ imaginary-invisible local mathematical points which occupy no space yet operate via hidden dimensional unknown material nonlocally entangled mechanisms. Such unnaturalness arises as an unacknowledged attempt to solve the *classical multi-body problem* on the universal(multiverse!) scale while the 3-body problem is proven to be *computationally intractable*.

Computationally intractable means an `AI worldview` cannot be computationally reproduced from the $SUSY$ hidden dimensional physics mechanisms. The committee could soon ask for an AI peer review of the matter perhaps utilizing the Isabelle Archive of Formal Proofs [8] and perhaps utilizing some future OpenAI natural language processing API [9] once the AI neural network automated theorem provers are able to understand multivariable calculus in the analytic domain.

`AI peer review` of $SUSY$ particle model requires explaining how nuclear force is "carried" by exchange of *unobservable* [*quark-emitter*→*gluon-carrier*←*quark-absorber*] *virtual particles* contrary to every **observed** [**emitter**↔**emitted**↔**absorber**] interaction resulting in a **repulsion** from any would-be line of attraction. And at ever higher-energies why don't the LHC beams of zero-sized particles which occupy no space just pass through one another without colliding?

Hence: `contradiction by AI`.

Thus the particle model ends and field integrations begin.

3. 4D Photon-Electron Soliton Gauge Group

Hence the radical new idea computationally reproduces a 4D spatially-extended photon-electron soliton gauge group `ForAll` wavelengths and energy levels utilizing Mathematica® `theorem proving operators` via Schwinger local field operator Dirac-Einstein-Maxwell gravitoelectromagnetic stress-energy momentum computationally dualistic energy-mass density pressure tensor field integrations along the perfect fluid metric pressure trace of the matrix [10].

The "entities beyond elementary particles" the committee sees as a possibility are the above immaterial field integration mathematical objects of the SCSC solid information domain and their fluid range of 4D spatially-extended elementary particle values along the perfect fluid metric pressure trace.

Superdeterminism is a consequence of SCSC since a singular mathematically possible universal complex system denotes a singular hypercomplex Hamiltonian configuration solid information domain for the fluid range of the Helmholz equations [11] series of spacetime events occurring autonomously as the known thermodynamic psychophysical experiences along the lines of the idealism theory of forms with everything being of one quantum information field.

Accordingly, this vision paper sees the elementary particles to be the elementary field integrations of the holographically bound cyclic energy density distribution universal wavefunction domain and range having no choice but to exist while time integrates autonomously at the speed of light through the domain evolving from $t_{-\infty} \to t_{\infty}$. Thus no classical multi-body cause and effect is seen only a series of 4D spacetime event *relative state effects* where in the universal wavefunction fluid range nothing can happen unless it already exists in the solid domain.

Quantum teleportation is therefore also a holographically bound effect and can only be occurring on an immaterial quantum information basis, since there are no hidden variable unknown material mechanisms then there are no hidden dualistic consciousness-material mechanisms somehow guiding the "collapse of the wavefunction" as it were.

4. Conclusion

Modern experimental physicists have completed an epic elimination of quantifiers proof rigorously testing the atomist-materialism teachings of the student Aristotle verifing the psychophysical parallelism of Parmenides in favor of the theory of forms of the teacher Plato.

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