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Impedance Matching to the Axion

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When seeking to understand symmetries of charge, parity, and time (the integral of phase), working in the easily visualized geometric representation of Clifford algebra rather than unintuitive matrix representations of Pauli and Dirac confers a remarkably clear and powerful perspective. Minimally complete vacuum wavefunction is the eight-component 3D Pauli algebra - 1 scalar, 3 vectors, 3 bivectors and 1 trivector - the same at all scales (Planck, Compton, deBroglie, galactic,…).

Combinations of the four fundamental constants that define the coupling constant $1/\alpha \simeq 137$ permit assigning geometrically and topologically appropriate E and B flux quanta to the eight wavefunction components. Interactions are modeled by the dimension-changing geometric Clifford product, generating the S-matrix in flat 4D Minkowski spacetime of Dirac algebra. Time emerges from interactions.

Mass is quantized. All rest mass particles have quantized mechanical impedances, easily converted to electromagnetic. The resulting networks of S-matrix mode impedances govern amplitude and phase of energy flow within and between eigenstates, conferring a remarkably clear and powerful perspective on CPT symmetries and their breaking. In the poster we focus upon the axion.

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