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A Relativistic Algebraic Approach to the Q/C Interface: Implications for "Quantum Reality"

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Abstract. Clifford's geometric algebra, in particular the algebra of physical space (APS), provides a new relativistic approach to the Quantum/Classical interface. It describes classical relativistic dynamics in quantum terms: spinor amplitudes with projectors describe classical motion and satisfy the Dirac equation of relativistic quantum theory. Some basic properties such as the spin-1/2 nature of elementary systems are seen to be a simple result of the geometry of physical space. The nature of "quantum reality" is constrained: the pure state of any single fermion is fully polarized and determines an exact spin direction, but an entangled pair can be unpolarized. Measurements can form or break entanglement, or they can transfer it between particle pairs. Quantum "weirdness" can arise from the need to use amplitudes of entangled systems.

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