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Spin, Dimensionality, and Topology in the Fano Plane

Thursday 15 December 2022 14:00 (1 hour)

The Fano plane is a visual mnemonic for deriving octonion algebra, for remembering multiplication of Clifford algebra vacuum wavefunctions not in the unintuitive matrix representations of Pauli and Dirac, but rather in the original intent of Clifford, as an algebra of geometric objects of 3D space - one spin 0 point, three spin 0 lines, three spin 1/2 areas, and one spin 1 volume (1,3,3,1). Clifford product is sum of dimension-reducing dot and increasing wedge products, transforms between bosons and fermions of dynamic SUSY. An earlier paper discusses this in some detail [1]. We extend that analysis from flat 4D Minkowski spacetime to 6D phase space. It conserves angular momentum, with fermions residing in the even dimension (0,2,4,6) algebra of eigenmodes, bosons in odd (1,3,5) transition modes. Remarkably, the swapping of e3 and e4 basis vectors in the conventional 'scalar plus seven square roots of negative one' math representation is replicated by the topological duality of 0D scalar electric and 3D pseudoscalar magnetic charge in the physics. Magnetic charge and 1D magnetic flux quantum are identical in SI units. Topological inversion of magnetic charge swaps magnetic 'dipole' moment and and flux quantum, such that Bohr magneton is axial bivector, and flux quantum a topological vector dipole, with poles at infinity. We explore this mix of spin, dimensionality, and topology, and how it relates to violation of spin conservation in S-matrix modes of the geometric representation.
[1]https://www.researchgate.net/publication/332174377_Quantum_Gravity_in_the_Fano_Plane

Session

Beyond the Standard Model

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