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Geometric Unification of Elementary Particles

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Imposing the metric as the fundamental structure of the 4-dimensional spacetime, Einstein derived the gravitational interaction. If instead of the metric we assume as fundamental structure the Frobenius integrable system of geodetic and shear-free Newman-Penrose null tetrad, all the elementary particles and gauge interactions are derived. This fundamental geometric structure is called lorentzian CR (LCR) structure, which is a special totally real CR-structure. It extends ordinary conformal (Weyl) transformation into a tetrad-Weyl transformation. The electron LCR-structure is directly related with Kerr-Newman manifold, providing a raison d'etre of its gyromagnetic ratio g=2, already computed by Carter. The neutrino LCR-structure is related to a twisted Robinson-Trautman metric. The tetrad-Weyl symmetry determines uniquely (up to duality) a dual type SU(N) gauge field equation without sources, which admits solutions of ordinary gluon equation with sources. This pseudo-conformal field theory (PCFT) is "quantized" using the Bogoliubov perturbative causal approach of the S-matrix combined with Scharf order by order elimination of the unphysical modes of the spin-one and spin two fields. The final result is the standard model of elementary particles with the Einstein equations. C. N. Ragiadakos, "Pseudo-conformal Field Theory", Journal of Physics: Conference Series 2912 (2024) 012015; ibid. arXiv:hep-th/1704.00321.

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