

Spacetime: $4+4 = 8$ and $6+4 = 10$

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This paper is a brief summary of some useful facts about Spacetime for E8 Physics.

In E8 Physics (viXra 1602.0319) at high energies Spacetime is the 8-dimensional Shilov Boundary $RP^1 \times S^7$ of the Type IV8 Bounded Complex Domain of the Symmetric Space $Spin(10) / Spin(8) \times U(1)$.

From this point of view, 8-dim Spacetime $RP^1 \times S^7$ Shilov Boundary which is acted upon by $Spin(1,7)$ is the Boundary of a Complex Bulk Space that is a Complex Domain of Type IV8 which Complex Bulk Space has 16 Real dimensions with Clifford Algebra $Cl(16)$. By 8-Periodicity, $Cl(16) =$ tensor product $Cl(8) \times Cl(8)$. $Cl(8)$ has 8 Vectors, 28 BiVectors, and 16 Spiinors with $8+28+16 = 52 = F_4$ Lie Algebra. $Cl(16)$ has 120 BiVectors, and 128 Half-Spiinors with $120+128 = 248 = E_8$ Lie Algebra.

The $Spin(1,7)$ action on 8-dim Spacetime is the BiVector Lie Algebra of $Cl(1,7)$ which is a Real Clifford Algebra and $Cl(1,7) = Cl(0,8) = Cl(4,4) = M(R,16) =$ Real 16×16 Matrix Algebra.

At lower energies the 8-dim Octonionic structure of the Shilov Boundary transitions to Quaternionic Structure of $Cl(2,6) = Cl(3,5) = M(H,8) =$ Quaternion 8×8 Matrix Algebra.

resulting in $(4+4)$ -dim Quaternionic Kaluza-Klein structure $M_4 \times CP^2$ where $CP^2 = SU(3) / SU(2) \times U(1)$ is Internal Symmetry Space and M_4 is physical Minkowski Spacetime of $Cl(1,3) = M(H,2)$,

Quaternionic $Cl(3,5)$ contains $Cl(2,4) = M(H,4)$ whose BiVector Lie Algebra is the Conformal Group $Spin(2,4) = SU(2,2)$ that has effective action on M_4 . so that the 4-dim M_4 part of $(4+4)$ -dim Kaluza-Klein $M_4 \times CP^2$ can be represented as the 6-dim space Cnf_6 which is the Vector space of $Cl(2,4)$ with BiVector $Spin(2,4)$ thus producing a Conformal $(6+4)$ -dim Spacetime with Kaluza-Klein structure $Cnf_6 \times CP^2$.

There is a corresponding Conformal Octonionic 10-dim Spacetime that is manifested in E8 Physics seen as a 26D String Theory with Strings being physically interpreted as World-Lines and the spin-2 entities being seen as carriers of the Bohm Quantum Potential with Sarfatti Back-Reaction.

From this point of view, 10-dim Spacetime is the Boundary of a Complex Bulk Space Domain of Type IV10 of the Symmetric Space $Spin(12) / Spin(10) \times U(1)$ whose Shilov Boundary is $RP^1 \times S^9$ on which $Spin(1,9) = SL(2,O)$ acts.

The $Spin(1,9)$ action on 8-dim Spacetime is the BiVector Lie Algebra of $Cl(1,9)$ which is a Real Clifford Algebra and $Cl(1,9) = Cl(2,8) = Cl(5,5) = M(R,32) =$ Real 32×32 Matrix Algebra. $Cl(1,9) = Cl(2,8) = Cl(5,5)$ is Conformal over $Cl(1,7) = Cl(0,8) = Cl(4,4)$.

Transition from Octonionic high-energy to Quaternionic low-energy gives $Cl(1,9) = Cl(2,8) = Cl(5,5) = M(R,32)$ transition to $Cl(3,7) = Cl(4,6) = Cl(0,10) = M(H,16)$.