

SO(7,7) structure of the SM fermions

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It has been suggested in the past (by several different authors) that the Standard Model gauge group can be combined with Lorentz group. If this is done, all fermions of a single generation of the SM receive the interpretation of components of a single spinor of a pseudo-orthogonal group $\text{Spin}(p,q)$ of dimension $p+q=14$. There are only two possibilities that do not lead to the fermion doubling - $\text{Spin}(11,3)$ and $\text{Spin}(7,7)$. The former has in particular been studied by Roberto Percacci. This talk advocates the second option. We point out that there is some exceptional geometry related to the Weyl representation of $\text{Spin}(7,7)$ (components of which are the SM fermions). In particular, we explain that a non-zero generic Weyl spinor of $\text{Spin}(7,7)$ defines a metric in 7 dimensions. This suggests that there is some hidden geometric structure behind the pattern of the SM fermions.

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