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The Standard Model, Left-Right Symmetry and the Exceptional Jordan Algebra

Recently, an intriguing connection between the exceptional Jordan algebra $h_3(\mathbb{O})$ and the standard model of particle physics was noticed by Dubois-Violette and Todorov (with further interpretation by Baez). How do the standard model fermions fit into this story? I will explain how they may be neatly incorporated by complexifying $h_3(\mathbb{O})$ or, relatedly, by passing from $\mathbb{R}\otimes\mathbb{O}$ to $\mathbb{C}\otimes\mathbb{O}$ in the "magic square" of normed division algebras. This, in turn, suggests that the standard model, with gauge group $SU(3)\times SU(2)\times U(1)$, is embedded in a left/right-symmetric theory, with gauge group $SU(3)\times SU(2)\times SU(2)\times U(1)$. This theory is not only experimentally viable, but offers some explanatory advantages over the standard model (including an elegant solution to the standard model's "strong CP problem"). I will discuss the relationship to the idea that the standard model may be described by a spectral triple in noncommutative geometry.