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Fractionally charged particles of the Standard Model

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The Standard Model gauge group that describes strong and electroweak interactions in nature is based on the universal cover $SU(3)_c \times SU(2)_L \times U(1)_Y$, which can be moded by discrete symmetries Z_p , where $p=\{1, 2, 3, 6\}$. Each of these possibilities recovers the usual Standard Model matter fields but also allows for new distinct representations. We will explore the allowed hypercharge spectra of each case and discuss the phenomenological implications that arise in our attempt to “nail down” the actual Standard Model gauge group.

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