

Investigation of dark matter in the 3-2-3-1 model

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We prove that the $SU(3)_C \otimes SU(2)_L \otimes SU(3)_R \otimes U(1)_X$ (3-2-3-1) gauge model always contains a matter parity $W_P = (-1)^{3(B-L)+2s}$ as conserved residual gauge symmetry, where $B - L = 2(\beta T_{8R} + X)$ is a $SU(3)_R \otimes U(1)_X$ charge. Due to the non-Abelian nature of $B - L$, the W -odd and W -even fields are actually unified in gauge multiplets. We investigate two viable versions for dark matter according to $\beta = \pm 1/\sqrt{3}$, where the dark matter candidates can be fermion, scalar, or vector fields. We figure out the parameter spaces in the allowed regions of the relic density and direct detection cross-sections.