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Baryon spectrum with $N_f=2+1+1$ twisted mass fermions

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We present results on the masses of the low lying baryons using gauge configurations with $N_f = 2 + 1 + 1$ flavors of maximally twisted mass fermions. The strange and charm quark masses are tuned to their physical values. We use three values of the lattice spacing, determined from the nucleon mass. Both cut-off effects and volume effects are investigated. We demonstrate that isospin symmetry breaking effects on the baryon masses are small and vanish at the continuum limit. Chiral extrapolations of the masses of the 20 spin-1/2 and 20 spin-3/2 baryons are performed using $SU(2)$ χ PT. After extrapolating to the physical pion mass and taking the continuum limit we find good agreement with the experimentally known baryon masses. Predictions are provided for the masses of the doubly and triply charmed Ω baryons, that have not yet been measured experimentally.

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