

Baryon Isospin Mass Splittings

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Summary

The contributions to the isospin splittings originate from two independent sources, the electromagnetic contribution and the strong interaction contribution. The electromagnetic contribution of the isospin symmetry breaking to the interaction Hamiltonian operator according to the commonly acceptable approach consists the spin independent coulomb interaction transformed like $Q \otimes Q$ and the spin dependent magnetic interaction transformed like $\vec{\mu} \otimes \vec{\mu}$. magnetic moment operator. The source of the strong interaction comes from the intrinsic quark mass difference $m_d - m_u$. Chan's unique contribution is to recognize that the induced baryon mass isospin splittings can be extrapolated from the strong flavor mass splittings using quark mass as a continuous parameter according to the flavor independence principle of QCD. All s-wave ground state baryon isospin splittings agree with 16 existing measurements with no exception with only three parameters.

L.-H. Chan, Phys. Rev. D15, 2478 (1977).

L.-H. Chan, Phys. Rev. D31, 204 (1985).

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