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Magnetic Moments of The Baryon Anti-decuplet and Octet pentaquark States

Magnetic Moments of The Baryon Anti-decuplet and Octet pentaquark States
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The baryons built of four quarks and an antiquark as the lowest Fock component, referred to as pentaquarks, are not forbidden by theory and have been discussed ever since the appearance of quark model. Pentaquarks are of special interest since the discovery of the θ+ particle by LEPs Collaboration.
The baryon magnetic moment is a fundamental observation as its mass, which encodes information of the underlying quark structure and dynamics.
In the present work the magnetic moments of baryon anti-decuplet and octet-pentaquark states have been estimated in the framework of diquark-diquark-antiquark configuration using the Composite Fermion (CF) model of diquark suggested by us. The mass of the diquark have been estimated in the CF approach and subsequently used to estimate the magnetic moments of baryon anti-decuplet and octet-pentaquark states. Starting from the Hamiltonian of a CF with momentum cut off Λ the expression for the quasi particle mass in gauge invariant system can be obtained as (with potential V=0):
1/(m)*=1/m(1+ Λ^4/(2p_f^4))*·····*(1)*
Where m is the effective mass of the CF, m be mass of each component, pf is the Fermi Momentum of CF and Λ is the cut off parameter. We have applied this CF picture of diquarks and computed the effective mass of diquark which is an important quantity for calculation of magnetic moment as it depends on the gyromagnetic ratio. The magnetic moment of a compound system is the sum of the magnetic moments of its constituents with the spin and orbitakl contribution such as:
(μ) ⃗=Σ i⃗(μ_ i) ⃗ =Σ_ i⃗ 〖(g(i) (S_i) ⃗+(l_i) ⃗)〗 μ_i·····(2)
Where g_(i)is the g factor and μ_i is the magneton of ith constituent .
We have calculated the magnetic moments of octet-pentaquark and antidecuplet states by considering the pentaquark as a bound state consists of two scalar diquark, one antiquark and onescalar, one vector diqurak and one antquark. The results are compared with predictions of other groups.

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