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SOME NUMERICAL RESULTS FOR THE ANOMALOUS QUADRUPOLE MOMENT PARAMETER OF THE W BOSON IN BROKEN SUPERSYMMETRIC $SU_L(2) \times U_Y(1)$

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ABSTRACT

The main purpose of this note is to present numerical values [limits] on the anomalous quadrupole moment of the W boson in broken-supersymmetric version of the standard model as the masses of the supersymmetric particles are varied. It was shown previously that in the supersymmetric limit the quadrupole contribution [ΔQ] cancelled among members of each supermultiplet. In our numerical analysis we are able to reproduce the previous result of complete cancellations, thus providing a check on our numerical evaluations. Although the anomalous quadrupole moment shows some sensitivity to the variation of the masses of the supersymmetric particles, the actual values of the various contributions to ΔQ remain small in the context of broken-supersymmetric extension of the standard model.

INTRODUCTION

Supersymmetry is one of the most elegant extensions of the standard model. It solves the hierarchy problem, one of the main drawbacks of grand unified theories, by introducing a fermion-boson symmetry. It is precisely this beautiful property of supersymmetry which provides a hope of unifying all forces of nature [We mean generalizations of global supersymmetry like supergravity and superstring theories.], and also allows forces and matter to be treated on the same footing. As a consequence of the fermi-bose symmetry, many new degrees of freedom corresponding to the supersymmetric partners [S-P] of the standard particles are predicted by the theory. However aesthetically appealing a theory might be, it must stand the test of the experiment. Therefore, it is of crucial interest to explore all the phenomenological implications of supersymmetric theories in order to eventually confront experiment.

A lot of work has been done on supersymmetric phenomenology [5-8]. The effect of supersymmetry on the physical properties such as g-2 of leptons [9], the two-photon decay width [10], the magnetic and quadrupole [4,3,1] moments of the W-boson has received some attention. Radiative corrections in $N = 1$ supersymmetry have been given