

SUPERSYMMETRIC ELECTROWEAK RADIATIVE CORRECTIONS TO $E^+ E^- \rightarrow W^+ W^-$

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ABSTRACT

In this short note we summarize some of the work of our thesis, which is also reported elsewhere in detail. We have examined the one loop quantum corrections to the W pair production in the context of supersymmetric electroweak theory. We have adopted the On Mass Shell Renormalization scheme of Sakakibara and previously demonstrated the consistency of the scheme. The relevant analytic results are written out. A complete computer program for these corrections has been developed. This program has been checked in several ways to ensure against errors in this long calculations where many subtle cancellations are involved. The major aim of our work was to calculate the Supersymmetric Quantum Flavor Dynamics [SQFD] one loop corrections to the process $e^+ e^- \rightarrow W^+ W^-$. The addition of the Supersymmetric [SUSY] particles tend to increase the percentage one loop corrections on the order of 8 percent. With an accurate measurement at LEP II, one can, in principle, detect such a deviation away from the Standard Model [SM].

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 [7,8,9,10,]. The effect of supersymmetry on the physical properties such as $g-2$ of leptons [11], the