Review of: "Explaining the W-boson Mass in the Context of the Supersymmetric 331 Model"

Waqas Ahmed

Potential competing interests: No potential competing interests to declare.

In their article titled "Explaining the W-boson Mass in the Context of the Supersymmetric 331 Model," the authors introduce the Minimal Supersymmetric 331 Model as a potential solution to address the observed excess in the W-boson mass, as reported by the CDF collaboration. The central premise of this approach involves the incorporation of a new sextet Higgs boson, denoted as S′, which could potentially resolve the issue at hand. The critical condition for this scenario to work is the requirement that the scalar field S′ acquires a vacuum expectation value of a few GeV.

The authors go on to elucidate their methodology, focusing on the analysis of the mass properties of the novel extra gauge bosons arising from the Minimal Supersymmetric 331 Model. These additional gauge bosons include Z′, V±, and U±±. The core of their investigation revolves around understanding the interplay between these new gauge bosons and their mixing within the framework of the model. The primary aim is to establish that the masses of these newly introduced gauge bosons align with the constraints imposed by current experimental data.

The article's strength lies in its incorporation of the Minimal Supersymmetric 331 Model as a novel approach to tackle the observed excess in the W-boson mass, which is an intriguing and pertinent problem in particle physics. By introducing a sextet Higgs boson and exploring its implications, the authors demonstrate a creative and theoretically robust solution. Additionally, the article could benefit from providing more context about the W-boson mass excess problem and its significance in the broader field of particle physics. However, the overall effectiveness of the article hinges on the credibility of the underlying theoretical model and the empirical evidence supporting its claims.