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Double Parton Scattering Effect in the Measurement of W-Mass

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Recently, the W boson mass measured by the CDF-II collaboration shows large tension with the standard model prediction and other measurements. In this work, we look into the double parton scattering (DPS) contribution in CDF-II W mass measurement. We show that the DPS process can increase the measured mass as $\Delta M_W = 20 - 200$ MeV for the missing transverse momentum fit and $\Delta M_W = 0 - 50$ MeV for the transverse mass fit. It is comparable to the W-mass tension and should be take into consideration. The DPS effect can also appears in other inclusive measurements, since it contributes $\sim 10^{-2}$ events in total and cause a $\mathcal{O}(10^{-2}) - \mathcal{O}(10^{-1})$ GeV shift of the missing transverse momentum.

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