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Measurements of the W boson mass and muon charge asymmetry with the D0 detector

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We present a measurement of the W boson mass using data corresponding to an integrated luminosity of 4.3 fb⁻¹ collected with the D0 detector during Run 2 at the Fermilab Tevatron ppbar collider. With a sample of 1,677,394 W → e ν candidate events, we measure $M_W = 80.367 \pm 0.026$ GeV. This result is combined with an earlier D0 result determined using an independent Run 2 data sample, corresponding to 1 fb⁻¹ of integrated luminosity, to yield $M_W = 80.375 \pm 0.023$ GeV. We also present a measurement of the muon charge asymmetry from W → μ ν decay using data corresponding to 7.3 fb⁻¹ of integrated luminosity. The measured asymmetry is compared with theory predictions and with the electron charge asymmetry measurement from the D0 Collaboration.

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