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Tevatron Energy Scan: Findings & Surprises

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We present results from a recent CDF study of min-bias collisions (MB) and the “underlying event” (UE) using charged particles produced in proton-antiproton collisions at 300 GeV, 900 GeV, and 1.96 TeV. The 300 GeV and 900 GeV data are a result of the “Tevatron Energy Scan” which was performed just before the Tevatron was shut down. The direction of the leading charged particle in each event, P_{Tmax} , is used to define three regions of eta-phi space; “toward”, “away”, and “transverse”. The “transverse” region is further divided into the “transMAX” and “transMIN” contributions. The “transMIN” region is very sensitive to the MPI & BBR components of the UE, while the “transDIF” region (“transMAX” minus “transMIN”) is more sensitive to the ISR & FSR. The data are corrected to the particle level and are compared with LHC data at 900 GeV and 7 TeV. This CDF analysis together with LHC UE data provides detailed information about the energy dependence of the various components of the UE which tests the UE models and constrain their parameters, allowing for more precise predictions at 13 TeV and 14 TeV.

Summary

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