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Prompt atmospheric neutrinos in the era of LHC and IceCube

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We evaluate the prompt atmospheric neutrino flux at high energies using different QCD frameworks for calculating the heavy quark production cross section in collisions of cosmic ray protons and atmospheric nuclei. We use QCD parameters consistent with heavy quark production cross sections measured at fixed target experiments, such as RHIC and LHC, to deduce a band of uncertainty for charm and bottom production in the atmosphere, and obtain the prompt neutrino flux expected therefrom. Finally, we compare our results with the IceCube limit on the prompt neutrino flux, which is already providing valuable information about some of the QCD models.

Summary

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