A Modern High-Precision Calculation of Deep Underground Cosmic Ray Muons

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This contribution is about providing a modern reference for calculations of cosmic ray muons deep underground with a new state-of-the-art method. The phenomenological fits of previous works may contain biases induced by systematic uncertainties, and theoretical calculations often lack rigorous treatment of theoretical uncertainties. To improve on this, we have combined the codes MCEq and PROPOSAL to develop a flexible and high-precision calculation of muon fluxes underground. The results match the previous predictions and the experimental data very well, and can be used to set important constraints for the physics of hadronic interactions and cosmic ray fluxes.