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High-pT muons in cosmic-ray air showers

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The composition of high-energy cosmic rays is a long-standing puzzle in astrophysics. One obstacle to understanding the composition is the significant theoretical uncertainties in predicting high-energy cosmic-ray air showers, which is difficult to improve because most air shower observables are sensitive to the details of the collinear region. To combat this problem, IceCube has measured high-pT muons from cosmic ray air showers by identifying muons far away from the shower core, which largely depend on perturbative QCD and therefore suffer from smaller theoretical uncertainties. I will discuss our theoretical predictions of high-pT muons in air showers and the robustness of this observable.

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