

# Studying hadronic interactions with inclusive atmospheric leptons

Wednesday, September 14, 2016 5:45 PM (15 minutes)

## Summary

Inclusive fluxes of atmospheric muons and neutrinos originate from cosmic ray induced particle cascades in the Earth's atmosphere. Such cascades contain all kinds of hadrons which can decay and produce leptons, or, they can interact and initiate sub-cascades at lower energies. The power-law nature of the cosmic ray flux emphasizes the very forward particle production phase-space, probing a highly non-perturbative regime. New sophisticated atmospheric lepton flux calculation methods enable us to study the role of non-perturbative processes, such as the leading particle effect or associated production, at energies far beyond recent fixed-target experiments. In our calculations we mainly employed the new version of the hadronic interaction model SIBYLL 2.3 to study the role of various hadron types, including charmed mesons. This talk will also address the connection between atmospheric lepton observables, such as the muon and neutrino fluxes and their charge or flavor ratios, to typical observables in particle physics experiments and show the relevant energy and Feynman-x ranges.

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**Session Classification:** Poster Session (coffee at 15:00) & CERN Visit

**Track Classification:** Cosmic rays