





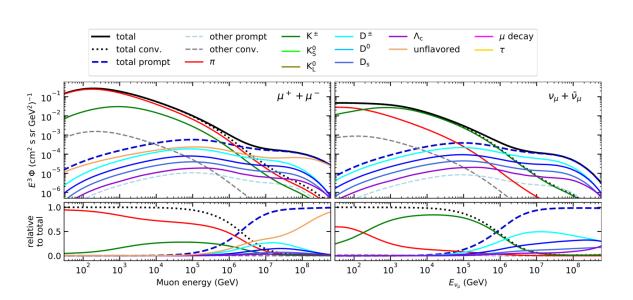
# ICRC: Measuring the Prompt Component of the Atmospheric Muon Flux using IceCube

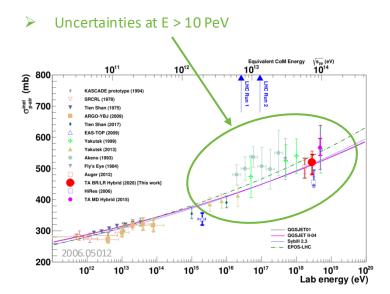
## **Motivation**

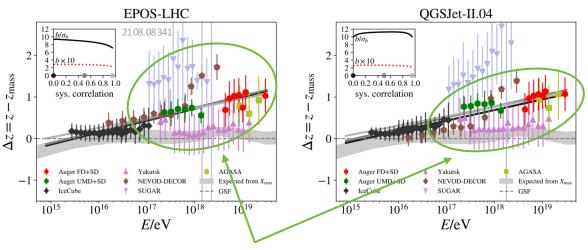
- fine-tune hadronic interaction models
- muon puzzle

## **Analysis goals**

- measure normalization of prompt muon flux
- unfold atmospheric muon flux













# Overview

# Simulation Reconstruction **Dataset DNN** reconstructions **CORSIKA 77500** Muon energies Ehist Muon direction SIBYLL 2.3d Track geometry 10 TeV - 100 EeV **Validation** Tag prompt / conv particles MCEq comparisons pascal.gutjahr@tu-dortmund.de

## Selection

## Level 3 L2 muon filter

- 500 TeV bundle energy cut at surface
- Add labels

#### Level 4

Add DNN reconstructions

#### Level 5

Data-MC quality cuts

## Forward fit

**Analysis** 

Fit prompt normalization

Poisson LLH fit

# Unfolding

**Muon spectrum** 

Unfold muon flux

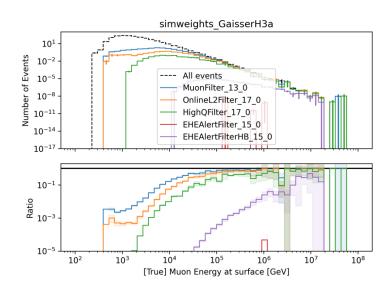




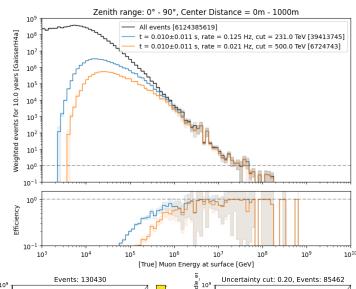
### ICECUBE NEUTRINO OBSERVATOR

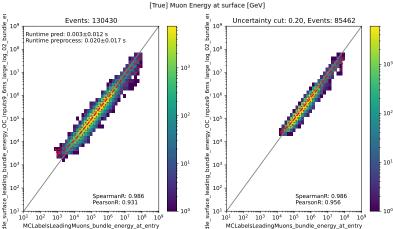
# Simulation, Reconstruction and Selection

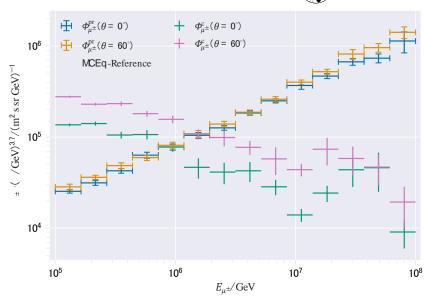
- new CORSIKA 7 extended history simulations compared to MCEq
- selection: muon filter, energy cut, data-MC quality cuts

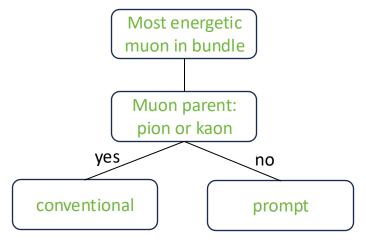










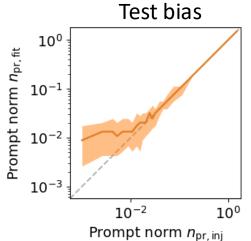




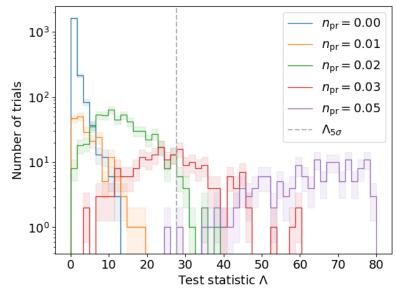


### ICECUBE NEUTRINO OBSERVATORY

# Forward Fit and Unfolding

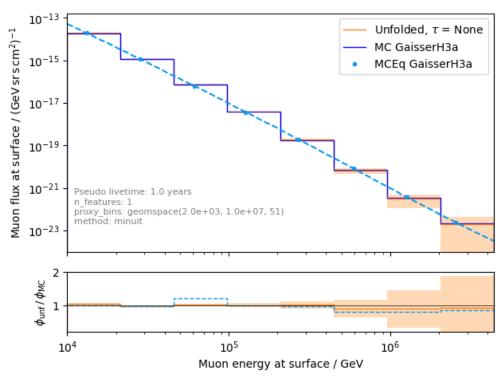


### trials for forward fit



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### unfolded muon flux at surface



# proxy variable

