

# CORSIKA EHIST Simulation for Prompt Muon Analysis

## Why:

- Scale amount of prompt particles → parents are necessary
  - Fit of prompt flux normalization
  - Get handle on hadronic interaction models
  - Scaling saves time and resources instead of doing multiple simulations with different interaction models
- Parent/grandparent information relevant for further studies regarding the shower development

## How:

- Latest CORSIKA 77420 with EHIST and SIBYLL 2.3d
- Update CORSIKA reader to work with EHIST
- Adopt I3MCTree

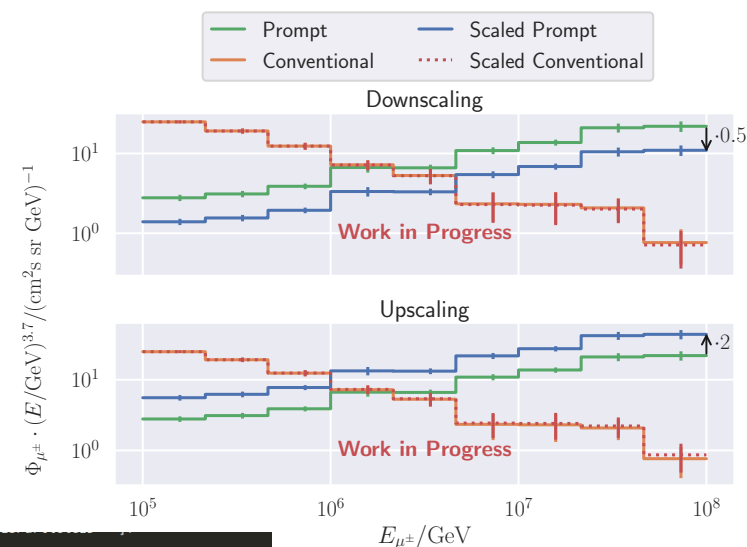
## What:

- Start test simulations with 5 TB (now)
- Full energy spectrum up to  $5 \times 10^{19}$  eV (focus on high energy)

$$\Phi_{\text{tot}} = \Phi_{\text{conv}} + \Phi_{\text{prompt}}$$

$$\pi, K \propto E^{-3.7}$$

prompt  $\propto E^{-2.7}$   
(all particles with a decay length lower than 0.123 cm)



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I3MCTree:
3001 PPlus (-162238m, 157642m, 108123m) (64.4051deg, 135.708deg) -819815ns 214166GeV 220335m
3002 PiPlus (nanm, nanm, nanm) (64.1885deg, 135.701deg) nanns 2077.16GeV nanm
3008 KPlus (-21004m, 19853.1m, 1884.56m) (64.1846deg, 135.7deg) nanns 1210.41GeV nanm
3009 NuMu (-3593.81m, 2844.39m, 1948.43m) (64.402deg, 135.662deg) -10.3179ns 409.741GeV nanm
3010 MuPlus (-3582.39m, 2855.52m, 1948.43m) (64.403deg, 135.7deg) -9.81788ns 795.696GeV nanm
3003 PiPlus (nanm, nanm, nanm) (64.2276deg, 135.706deg) nanns 1992.84GeV nanm
3011 Rho7700 (-17868.8m, 16795.2m, 1902.91m) (64.229deg, 135.719deg) nanns 1729.8GeV nanm
3012 unknown (nanm, nanm, nanm) (nandeg, nandeg) nanns nanGeV nanm
3013 NuMuBar (-3555.5m, 2848.75m, 1948.45m) (64.4281deg, 135.744deg) 63.2446ns 304.713GeV nanm
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