Floor of cosmogenic neutrino fluxes above 10^{17} eV

Antonio Condorelli, Corinne Berat, Olivier Deligny, Francois Montanet, Zoe Torres

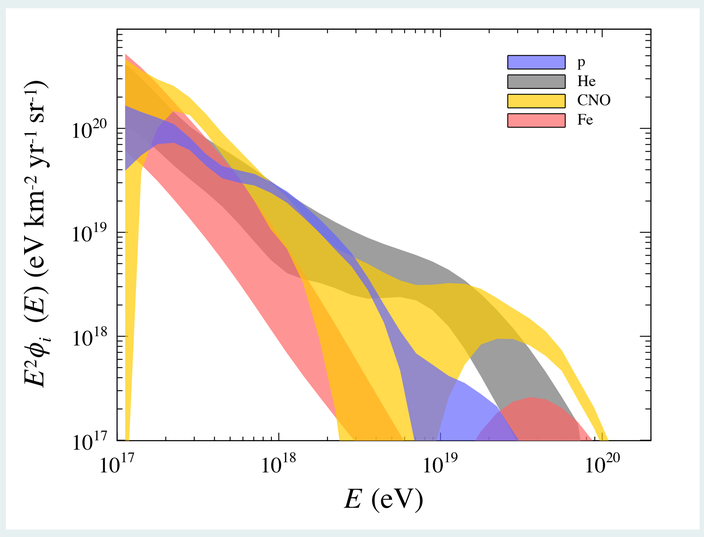
antonio.condorelli@unina.it **DOI** 10.3847/1538-4357/ad372a

What is the minimal neutrino flux associated to the Ultra-high-energy cosmic rays?

UHECRs

The mass-discriminated energy-flux spectra of UHE cosmic rays present some **features**:

A component of Fe nuclei is observed to **falloff steeply** above 10^{17} eV (end of the galactic spectrum?), while protons, helium, and CNO-group nuclei fluxes are well reproduced by nuclear components that **drop off at the same magnetic rigidity** featuring a **hard** spectral index.

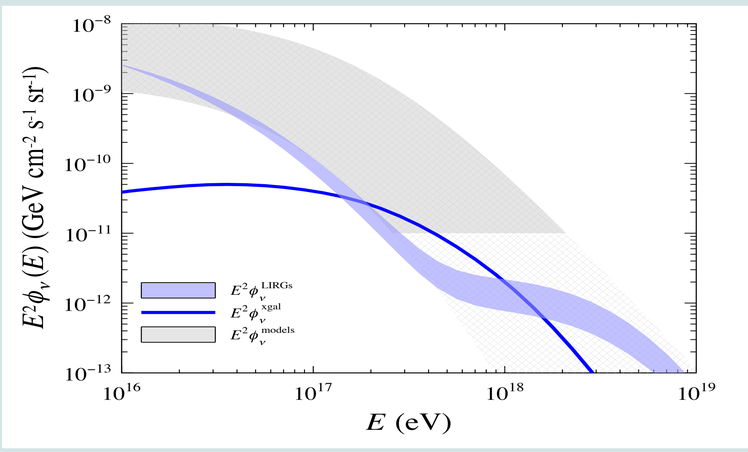


Bands –> different hadronic interaction models.

Extra-galactic contribution

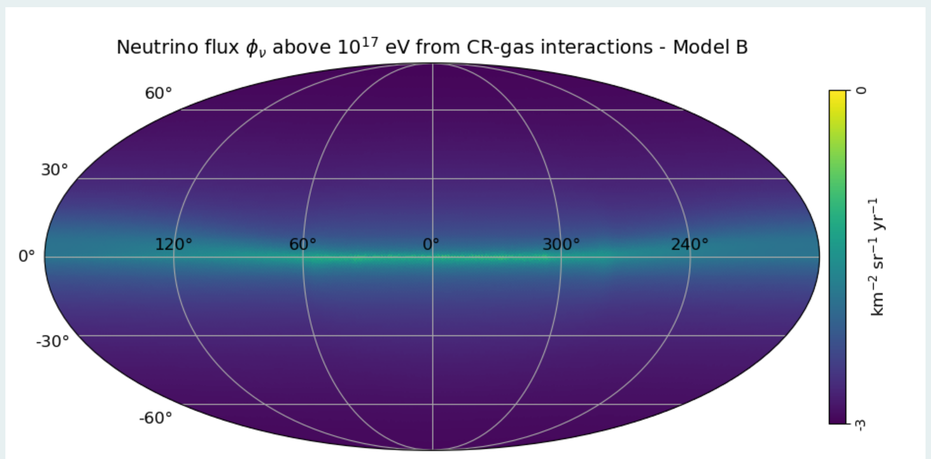
Assuming a generic source as standard candle for UHECR acceleration → luminous infrared galaxies (LIRGs).

Propagation in the **source environment** and in the **extra-galactic space** → computing neutrino fluxes associated for different acceleration hypothesis.



Galactic contribution

Target: Most of the mass in the interstellar medium in the Galaxy is distributed predominantly **in the disk** and is made by **hydrogen** ($\simeq 90\,\%$) and **helium** ($\simeq 10\,\%$) in gaseous state. Two models of the spatial distribution of the gas are used → differences in the final neutrino expectation.



Take-home message

The neutrino flux associated to the UHECR propagation is **very low**, room for detecting subdominant **UHE protons** and/or **dark matter decay**.