CALCULATING NEUTRINO FLUX WITH NUFATE
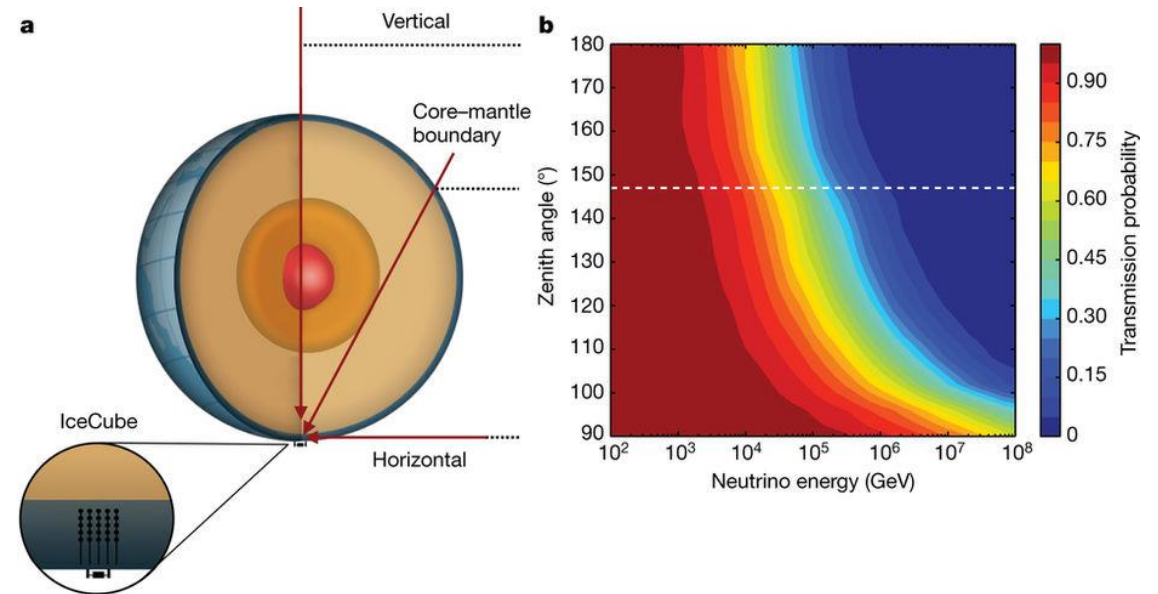
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Calculating Flux

nuFATE uses neutrino cross sections from probability density distributions to calculate attenuated neutrino flux.

The flux is a function of the energy, neutrino flavor, and path through the Earth.

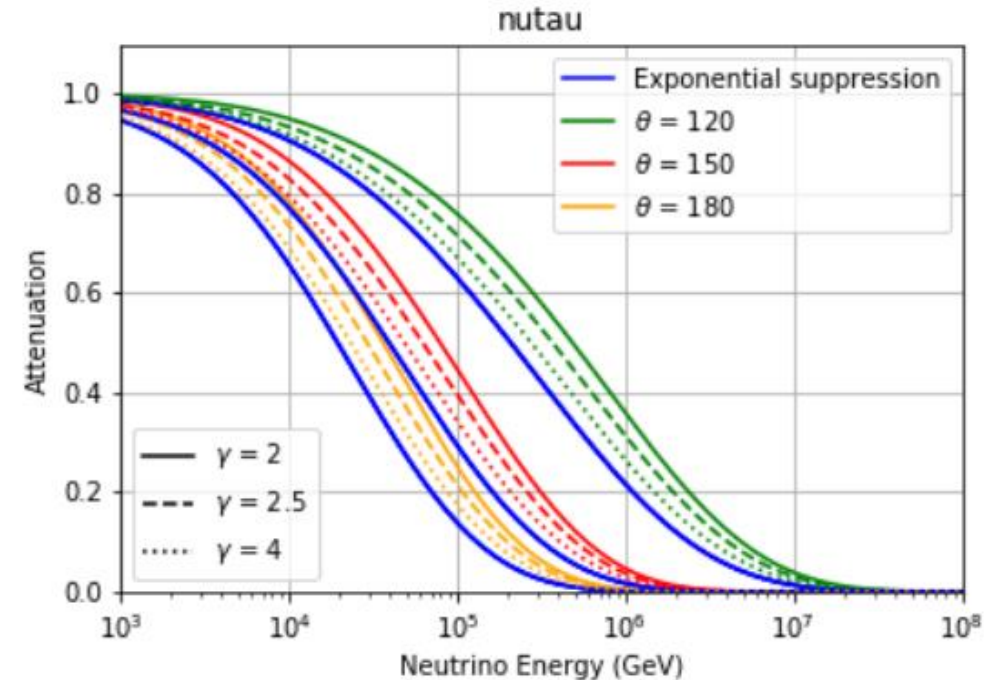https://www.nature.com/articles/nature24459

Comparing Attenuation to Expected Suppression

Varied parameters to analyze the effect on the flux.

- e.g. changed zenith and gamma value (spectral index) to study the effect on the flux.

- Attenuation ratio decreases as zenith and gamma increase.

- Additionally examined the attenuation for energies from 1 TeV to 10 PeV.

Code Development

Added a scaling factor to change the flux.

Added a depth parameter to change the location of where the neutrino is being detected.

(Originally measured from the surface, inconsistent with IceCube).

Changed the default Earth model used by nuFATE to be more accurate.

However, the effect wasn't appreciable.