

Measurement of the multi-TeV neutrino interaction cross-section with IceCube using Earth absorption

The IceCube Collaboration

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The neutrino flux

1. What are the sources of astrophysical neutrinos of energy around 300 TeV? (**Utsav**)

Neutrino-nucleon cross sections etc.

1. Why is the cross section expected to increase linearly with energy until about $E_\nu = 1$ TeV? Why does it then start increasing slower-than-linear? (**Abinash**)
2. Why do the neutrino and anti-neutrino $\frac{\sigma_\nu}{E}$ in fig. 1 get closer together as the energy increases? (**Bishnu**)
3. Can we explain the correspondence of earth's diameter to one absorption length for 40-TeV neutrinos? Can we see it in fig. 2(b)? (**Robert**)
4. What is nuclear shadowing? (**Tyler**)

Detecting the neutrinos

1. What does the ice molecule do to help us detect the neutrino interaction? Why ice? (**Doug**)
2. How precisely can you find the direction the neutrino was traveling? (**Kristyn**)
3. Energy proxy is used because of the limited energy resolution. What is the energy proxy? Why is it useful? Why is the energy resolution limited? (**Taya**)
4. In IceCube experiment they look for signature of muon produced when $\nu/\bar{\nu}$ interacts with ice molecules. Are there any particles from radioactivity from inside earth that could possibly produce similar signatures as muons do? Are there other backgrounds? (**Mamun**)

Results

1. In fig. 1 why do the results appear to be shifted up from the standard model predictions? (**Som**)
2. What is log-likelihood (LLH)? How is it used to determine the range of E_ν energies for which this experiment is sensitive to the neutrino-nucleon cross section? (**Matt**)

Other experiments

1. What other accelerator based neutrino experiments exist today? (**Ibrahim**)
2. How will IceCube gen 2 being larger allow you to measure higher energies? How is it larger? How much does it cost? (**Joey**)
3. What is KM3Net? How much does it cost? (**Shiv**)