



Contribution ID: 11

Type: oral

Probing the Glashow resonance and beyond with ultrahigh energy neutrino telescopes

Wednesday, 31 May 2023 16:30 (20 minutes)

The standard model (SM) of particle physics predicts the resonant scattering of electron anti-neutrinos off the electron target, as first pointed out by Sheldon Glashow. The Glashow resonance is the only feasible way now to distinguish between neutrinos and antineutrinos at ultrahigh energies. Recently, a candidate event with an energy deposition of around 6.05 PeV has been confirmed by the IceCube Observatory. Such an event arises very likely from the Glashow resonance and can provide us valuable information about the source of cosmic rays and ultrahigh energy neutrinos. I will first talk about the implications of this Glashow resonance candidate to cosmic neutrino sources, incorporating both the atomic Doppler broadening effect and initial state radiation while calculating the cross section. Then, I move on to discussing the prospect of upcoming neutrino telescopes. In particular, the potential of mountain-valley telescopes for the Glashow resonance will be emphasized. Finally, I will discuss exotic resonances arising from new physics beyond the SM.

Summary

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Session Classification: Afternoon Session II