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Probing Neutrino Mass Models at Neutrino Telescopes

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The detection of ultra-high energy (UHE) neutrinos by the IceCube neutrino telescope has ushered in a new era of neutrino astrophysics. We will discuss how the IceCube data can as well be used as an effective probe of neutrino mass models. In particular, we will show that the mediators of some well-motivated radiative neutrino mass models can give rise to Glashow-like resonance features in the UHE event spectrum that could potentially be observed at IceCube and/or its high-energy upgrade IceCube-Gen2. The same mediators can also give rise to observable non-standard neutrino interactions (NSI), which is currently being probed by the long-baseline neutrino experiments, and we show that the UHE neutrinos provide a complementary probe of NSI. Finally, we will also discuss an interesting possibility of producing such resonances by incoming sterile neutrino components in the case where neutrinos are pseudo-Dirac particles.

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