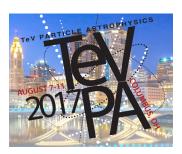
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## Multi-PeV Signals from a New Astrophysical Neutrino Flux Beyond the Glashow Resonance

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The IceCube neutrino discovery was punctuated by three showers with  $E_{\nu}$  ~ 1-2 PeV. Interest is intense in possible fluxes at higher energies, though a marked lack of  $E_{\nu}$  ~ 6 PeV Glashow resonance events implies a spectrum that is soft and/or cutoff below ~few PeV. However, IceCube recently reported a through-going track event depositing 2.6  $\pm$  0.3 PeV. A muon depositing so much energy can imply  $E_{\nu_{\mu}}$  gtrsim 10 PeV. We show that extending the soft  $E_{\nu}^{-2.6}$  spectral fit from TeV-PeV data is unlikely to yield such an event. Alternatively, a tau can deposit this much energy, though requiring  $E_{\nu_{\tau}}$  ~10x higher. We find that either scenario hints at a new flux, with the hierarchy of  $\nu_{\mu}$  and  $\nu_{\tau}$  energies suggesting a window into astrophysical neutrinos at  $E_{\nu}$  ~ 100 PeV if a tau. We address implications, including for ultrahigh-energy

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