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TauRunner: A Monte Carlo for Very-High-Energy Tau Neutrino Propagation OSWALDO VAZQUEZ, Harvard University, IBRAHIM SAFA, JEFFREY LAZAR, University of Wisconsin-Madison; Harvard University, ALEX PIZZUTO, University of Wisconsin-Madison, CARLOS ARGELLES, Harvard University, ALI KHEIRANDISH, The Pennsylvania State University, JUSTIN VANDENBROUCKE, University of Wisconsin-Madison — Very-High-Energy (VHE) neutrinos are expected to be produced by cosmic-ray interactions with the Cosmic Microwave Background (CMB). In these photo-hadronic interactions, ν_μ and ν_e are produced. As these neutrinos traverse the cosmic void, they morph from one flavor to another, yielding, in the standard scenario, a democratic flavor composition at their arrival on Earth. This so-called cosmogenic flux of VHE neutrinos is a target of the next generation neutrino observatories: IceCube-Gen2, TAMBO, RNO, GRAND, POEMMA, and CHANT. In a recent publication, a novel detection strategy for these neutrinos has been put forward. This new technique relies on the observation of Earth-throughgoing ν_τ at PeV energies. By measuring the flux at this energy, we can indirectly observe the flux at EeV energies since these two are related by the cascading down of the neutrinos. However, such a link demands an accurate simulation of the VHE ν_τ transport. TauRunner is a Python Monte Carlo (MC) package specialized in EeV ν_τ transport with the limitation of not accounting for secondary flavors produced in some τ decay channels. In this contribution, I will present the newest version of this MC, which now incorporates all neutrino flavors in the propagation

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