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High Energy Neutrino Emission Induced by Ultrahigh Energy Nuclei in Cluster Accretion Shocks KE FANG, ANGELA OLINTO, Univ of Chicago — Accretion shocks in clusters of galaxies can potentially accelerate protons to above 10^{17} eV and nuclei to ultrahigh energies. High energy neutrinos are produced when these cosmic rays interact with baryons of the massive cluster, or with CMB photons during their extragalactic propagation. In light of the recent IceCube discovery of TeV-PeV neutrinos, we calculate the neutrino emissions from accretion shocks, using a complete numerical propagation method and calibrated based on precision ΛCDM simulation. We pin down the uncertainty and degeneracy in source parameters by taking into account the cosmological evolution of cluster mass, density profiles, velocity dispersions, along with the gravitational gas accretion rates. We find that the neutrino spectrum is distinct from E^{-2} after considering the cluster mass function which impact both maximum energy and luminosity of the accelerated cosmic rays. We compare the cumulative neutrino flux to sensitivities of the existing and future high energy neutrino observatories. We also discuss the implication of our results on the scenario of cluster accretion shocks being the sources of ultrahigh energy cosmic rays.

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