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# The Ordinary and the Wondrous: Neutrinos from Star-Forming Galaxies and from Extraterrestrial Megaprojects

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Star-forming galaxies (SFGs) are among the most numerous extragalactic sources. I describe my results in calculating the extragalactic radiation from SFGs at all energies. I construct very simple models of galaxies using empirical relations like the Schmidt law to estimate the properties of galaxies, and then use basic one-zone models of radiative transfer to calculate the stellar, dust, supernovae, and nonthermal emission. My approach allows for a self-consistent calculation that allows me to compare the energetics of the gamma-ray and TeV/PeV neutrino backgrounds with the UV/IR and the MeV supernova neutrino backgrounds. I discuss the energetics issues that make it hard for SFGs to explain all of the IceCube PeV neutrino background.

Extraterrestrial beings (ETs) are among the most spectacular possible discoveries imaginable. If ETs wish to experimentally test Grand Unified or Planck scale physics, they could end up building particle accelerators bigger and brighter than stars. These could radiate high energy neutrinos, perhaps of far higher energy than ultra high energy cosmic rays. I describe current limits on Planck energy neutrinos from experiments and an indirect "W-burst" limit, and consider how we might build a much bigger effective YeV neutrino detection experiment. These limits indicate that particle accelerators (natural or artificial) with galaxy-scale luminosities are very rare, hosted by perhaps less than 1 in 10^4 SFGs.

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