

Forecasted Sensitivity of IceCube-Gen2 to the Astrophysical Diffuse Spectrum

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IceCube-Gen2-Optical is a planned large-scale upgrade to the existing IceCube Neutrino Observatory. This ~ 8 cubic kilometer in-ice detector is optimized for point-source science, yielding integer-factor improvements to angular resolution, and increased sensitivity to higher energies. Here, impact on future study of the diffuse astrophysical spectrum is presented. New analyses of upgoing muon neutrino tracks and of all-sky cascade events, are performed by adapting standard IceCube selection and analysis methods to this proposed configuration. Improvements to sensitivity of both analyses are discussed, along with the combined result. The all-sky cascade analysis excludes a majority of the parameter space allowed by the same period of IceCube observation. I explain the impact of leading atmospheric systematics on IceCube-Gen2 diffuse sensitivity, and on that of similar, future experiments. A characterization of the Gen2 optical and radio diffuse programs, and implications for the body of potential astrophysical sources in this coming era of next-generation, volumetric neutrino experiments, are provided.

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