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Evidence of Neutrino Emission from Southern Sky X-ray Bright Seyfert Galaxies with IceCube

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The IceCube Neutrino Observatory has detected TeV-scale neutrinos from NGC 1068, supporting the hypothesis that active galactic nuclei (AGN) may host high-energy neutrino production in obscured environments. Motivated by this, we investigate a catalog of intrinsically X-ray bright Seyfert galaxies in the Southern sky using a coronal model, which suggests cosmic-ray acceleration and hadronic interactions occur in the hot corona near the AGN engine. The coronal model links intrinsic X-ray and neutrino luminosities, providing a physically motivated spectral shape to guide source selection and provide stacking weights, which improves the discovery potential of our search. We use starting track events (ESTES) in our studies of the Southern sky. Some of our candidate neutrino sources, though extragalactic, lie near the Galactic plane in projection, challenging the analysis with significant background contamination. In this contribution, we present our background estimation methods developed for this region and show the evidence for collective neutrino emission from our selected sources. We also compare and discuss the search results of using the coronal model and using the generic power-law assumption.

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