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IceCat-2: Updated IceCube Event Catalog of Alert Tracks

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We present preliminary results for IceCat-2, the second public catalog of IceCat Alert Tracks, which plans to build and improve upon the first release, IceCat-1. The initial catalog included all real-time alerts issued since 2016, as well as events observed by IceCube since the start of full-detector data collection in 2011 that would have triggered an alert if the program had been in place at that time. IceCat-2 plans to expand on this by incorporating all additional alerts since IceCat-1, and reprocessing all events with significantly improved reconstruction algorithms. A key advancement in IceCat-2 will come from an updated reconstruction technique introduced by the IceCube Collaboration in September 2024. This approach substantially enhances the angular resolution of muon track alerts, while also improving statistical coverage. With respect to IceCat-1, the 50%(90%) angular uncertainty on track alerts is expected to be reduced by a factor of approximately 5(4). These refined reconstructions will allow us to revisit possible correlations between past alerts and sources in gamma-ray and X-ray catalogs. The enhanced precision may uncover new astrophysical associations with known astrophysical sources, offering deeper insight into potential cosmic ray accelerators.

Collaboration(s)

IceCube Collaboration

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