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A new IceCube starting track event selection and realtime stream

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IceCube analyses which look for an astrophysical neutrino signal in the southern sky face a large background of atmospheric neutrinos and muons created in cosmic ray air showers. Earlier, it was found that rejecting events that deposit energy in the outer region of the detector reduces not only the muon background, but also the atmospheric neutrino background in the southern sky due to the atmospheric self-veto effect. However, using outer layer fiducial cuts reduces the size of the detector and leads to a selection optimized for cascades. In this event sample, we select for muon tracks which have a starting vertex contained inside the detector. By using the improved directional reconstruction from muons, the selection determines a veto region behind the starting vertex for each event and calculates the likelihood for not observing a hit on the IceCube optical modules (DOMs) in the veto region. These cuts give a selection which has a high astrophysical neutrino purity above 10 TeV in the southern sky. We will present our most recent results from our neutrino point source and diffuse flux searches and provide a first look at the realtime events stream derived from the selection.

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