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Simulation of the Event Reconstruction of Ultra High Energy Cosmic Neutrinos with Askaryan Radio Array

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Askaryan Radio Array (ARA), a large-scale radio Cherenkov observatory which scientists propose to develop in Antarctica, aims at discovering the origin and evolution of the cosmic accelerators that produce the highest energy cosmic rays by means of observing the ultra high energy (UHE) cosmogenic neutrinos. To optimize ARA's angular resolution of the incoming UHE neutrinos, which is essential for pointing back to its source, the relation between the reconstruction capabilities of ARA and its design is studied. It is found that with the noise effect taken into account, in order to make this neutrino angular resolution as good as possible and detection efficiency as high as possible, the optimal choice for ARA geometry would be the station spacing of 1.6 km and the antenna spacing of 40 m.

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