

# Science case and detector concept for ARIANNA high energy neutrino telescope at Moore's Bay, Antarctica

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The proposed ARIANNA neutrino detector, located at sea-level on the Ross Ice Shelf, Antarctica, consists of 200 autonomous and independent detector stations separated by 1 kilometer in a uniform triangular mesh. The primary science mission of ARIANNA is to search for sources of neutrinos with energies greater than 100 PeV, complementing the reach of IceCube. An ARIANNA observation of a neutrino source would provide strong insight into the enigmatic sources of cosmic rays. ARIANNA observes the radio emission from high energy neutrino interactions in the Antarctic ice. Among radio based concepts under current investigation, ARIANNA would uniquely survey the vast majority of the southern sky at any instant in time, and an important region of the northern sky, by virtue of its location on the surface of the Ross Ice Shelf in Antarctica. The broad sky coverage is specific to the Moore's Bay site, and makes the ARIANNA surface-based technology ideally suited to contribute to the multi-messenger thrust by the US National Science Foundation, Windows on the Universe –Multi-Messenger Astrophysics, providing capabilities to observe sources that vary strongly over time. The ARIANNA architecture is designed to measure the angular direction to 3 degrees and shower energy to 25% for every neutrino candidate. These high quality neutrino events are expected to play important role in the pursuit of multi-messenger observations of astrophysical sources. The surface-based architecture serves to inform future projects of much larger scale, such as the IceCube-Gen2 project.

## Keywords

neutrino; high-energy; Askaryan; radio; Antarctica; ice; Moore's Bay; Ross Ice Shelf; point sources, diffuse flux

## Collaboration

other (fill field below)

## other Collaboration

ARIANNA

## Subcategory

Future projects

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