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ARIANNA: A New Concept for UHE Neutrino Detection

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Abstract content

The ARIANNA concept utilizes the Ross Ice Shelf near the coast of Antarctica to increase the sensitivity to cosmogenic neutrinos by roughly an order of magnitude when compared to the sensitivity of existing detectors and those under construction. Therefore, ARIANNA can test a wide variety of scenarios for GZK neutrino production, and probe for physics beyond the standard model by measuring the neutrino cross-section at center of mass energies near 100 TeV. ARIANNA capitalizes on several remarkable properties of the Ross Ice Shelf: shelf ice is relatively transparent to electromagnetic radiation at radio frequencies and the water-ice boundary below the shelf creates a good mirror to reflect radio signals from interactions by neutrinos traveling downward. The high sensitivity results from nearly six months of continuous operation, low energy threshold (˜3x10ˆ17 eV), and more than 2*pi of sky coverage. The baseline concept for ARIANNA consists of moderately high gain antenna stations arranged on a 100 x 100 square grid, separated by about 300m. Each station consist of eight linearly polarized antennas residing just beneath the snow surface and facing downwards. They communicate with each other and a central control hub by wireless links to generate global triggers. This paper describes the ARIANNA concept, science goals, and recent progress in the development of the detector.

If this papers is presented for a collaboration, please specify the collaboration

ARIANNA collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 5 (HE part 2), pages 1601-1604

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