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GRAND: The Giant Radio Array for Neutrino Detection

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Abstract content

Progress in finding the origin of ultra-high-energy cosmic rays (UHECRs) will come from discovering the secondary UHE neutrinos produced in UHECR interactions. Yet, the flux of UHE neutrinos may lie beyond the reach of existing detectors and their possible upgrades. GRAND is a planned large-scale UHE observatory designed to discover UHE neutrinos even if their flux is low. It will do so by measuring the radio emission from extensive air showers triggered by UHE particles in the atmosphere — not only neutrinos, but also cosmic rays and gamma rays. For UHE neutrinos, GRAND aims to reach a sensitivity of $\sim 10^{-10}$ GeV cm^{-2} s^{-1} sr^{-1} in 3 years, a factor-of-100 improvement over potential upgrades of existing detectors. Further, GRAND aims for an aperture to cosmic rays above 10^{10} GeV that is 20 times larger than in Auger, and a sensitivity to a flux of UHE gamma rays that is 10 times better. Besides, GRAND will be a powerful instrument for radioastronomy. In this talk, I will showcase the rich science program of GRAND, its design, and its construction status and plans.

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