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Search for magnetic monopoles and nuclearites with the ANTARES experiment

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The ANTARES neutrino telescope was installed in the Mediterranean Sea in several stages, and was completed in 2008. It comprises a three-dimensional array of 885 Optical Modules distributed on 12 vertical lines, anchored at a depth of 2475 m. While designed to observe upgoing neutrinos, ANTARES could also be sensitive to the bright signal of relativistic magnetic monopoles and slow nuclearites.

Magnetic monopoles are stable particles first predicted by Dirac in 1931, and decades later in various Grand Unified Theories (GUT). Relativistic magnetic monopoles would produce a large amount of Cherenkov light in the detector, surpassing by 8500 times the intensity of light emitted by a muon. A dedicated analysis and a new upper limit on the magnetic monopole flux, extracted from ANTARES data taken in 2008, is presented.

Nuclearites are massive particles of strange quark matter that may be present in the cosmic radiation. Their origin could be in the early Universe or in energetic astrophysical phenomena, like supernovae or strange stars collisions. Nuclearites are supposed to be neutral particles and to interact with the surrounding media via elastic and quasi elastic collisions.

The search strategy and the preliminary upper limit for a nuclearite flux will be presented, using data collected during 2007 and 2008.

Author: Ms PAVALAS, Gabriela Emilia (Institute for Space Sciences, Bucharest, Romania)

Presenter: Ms PAVALAS, Gabriela Emilia (Institute for Space Sciences, Bucharest, Romania)

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