



Contribution ID: 351

Type: **Poster contribution**

Search for nuclearites with the ANTARES neutrino telescope

Saturday, August 1, 2015 3:30 PM (1 hour)

About thirty years ago, strange quark matter (SQM) was hypothesized to be the ground state of hadronic matter and was also suggested as a cold dark matter candidate. Although there is no experimental or astrophysical evidence for its existence so far, SQM may be present in the cosmic radiation as relic particles of the early Universe, or as fragments released in binary strange star collisions or supernovae.

The ANTARES neutrino telescope is sensitive to massive and stable SQM particles, denoted as nuclearites. Their velocity is assumed to be $\beta \sim 10^{-3}$, typical of objects gravitationally trapped inside the galaxy. Nuclearites reaching the ANTARES depth would yield a large amount of light in the detector, by means of the blackbody radiation emitted by the heated water molecules along their path. A dedicated analysis will be presented, as well as upper limits on a flux of downgoing nuclearites.

Collaboration

ANTARES

Registration number following "ICRC2015-I"

338

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