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Search for cosmic neutrinos with ANTARES

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Propositions associated with the dissertation

Search for cosmic neutrinos with ANTARES

1. A reduction of the PMT efficiency used in the ANTARES neutrino telescope does not affect its angular resolution in first order - Chapter 5.
2. For a PMT time resolution with an additional 3 ns smearing, simulations show a deterioration of the angular resolution by 30%. Moreover, one loses the agreement between the observed events and the expected neutrino signal resulting in a discrepancy of almost 2σ , where σ is the uncertainty on the atmospheric neutrino flux - Chapter 5.
3. For a full-sky search, the mean number of signal events needed for a 3σ discovery equals 5.8 - Chapter 7.
4. The use of the number of hits in the event as an energy estimator improves the 5σ discovery probability for a full-sky search by 25% - Chapter 7.
5. The detection of astrophysical neutrinos may provide the answers to questions regarding the origin and the acceleration of cosmic rays - T. K. Gaisser and T. Stanev, *Astrop. Phys.*, **39**:120-128, 2012.
6. The detection of astrophysical neutrinos is considered a key ingredient to decide whether the gamma-ray emission from an astrophysical source is due to leptonic or hadronic mechanisms - E. G. Berezhko and H. G. Völk, *Astronomy & Astrophysics*, **492**:695, 2008.
7. The observation of TeV gamma-rays provides for a possible route to the detection of astrophysical neutrinos - J. K. Becker, *Phys. Rept.*, **458**:173-246, 2008.
8. To our current knowledge, supernova remnants are the most probable sources of astrophysical neutrinos - M. Mandelartz and J. Becker-Tjus, available as ArXiv e-print, <http://arxiv.org/abs/1301.2437>.
9. The future of neutrino astronomy is bright.

Leiden, 15/05/2014

Claudio Bogazzi