



**Irfu**

Institut de recherche  
sur les lois fondamentales  
de l'Univers

**Séminaire  
SPP**

**Lundi 02/12/2013, 11h00**

CEA-Saclay Bat 141, salle André Berthelot

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# Radio Detection of Ultra High Energy Neutrinos

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Experimental evidence for the Greisen-Zatsepin-Kuzmin (GZK) cutoff in the cosmic ray spectrum has a number of profound implications for our understanding of high energy astroparticle physics. This GZK process itself produces neutrinos that are strongly believed to be both spectrally and spatially correlated to high energy cosmic ray particles above 100 EeV.

In the 1960's Askaryan predicted that the interaction of such high energy neutrinos would lead to coherent Cherenkov radiation due the spatially compact nature of such showers. In June 2006 these Askaryan effect predictions were verified for EeV showers in a 7 ton ice target at SLAC. A number of current and future experiments are now actively exploiting this radio detection method to search for this "guaranteed" flux of high energy neutrinos. None have yet been observed, though the sensitivity of the detectors is now excluding the region of predicted fluxes.

The Antarctic Impulse Transient Antenna (ANITA) experiment, a long-duration balloon operating at an altitude of 37km, has flown twice, setting the best flux limits in the region of sensitivity. In order to improve the sensitivity in a 3rd flight, the threshold of the trigger and the fidelity of the digitizer are being improved. While no neutrino signal was observed, a sample of UHE cosmic ray events were. The trigger is being reconfigured to more efficiently select these very inclined air shower events, as they represent a complementary sample to that of the AUGER array. A status report on the preparation for the December 2014 flight will be reported.

Time permitting, details of the 2 ASICs that have been developed to realize the 3rd flight upgrades will be presented.

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Le café sera servi 10 minutes avant.

NB : La présentation d'une pièce d'identité est exigée à l'entrée du centre. Tous les auditeurs extérieurs sont priés de prévenir à l'avance Martine Oger, tél. 01 69 08 23 50, e-mail : [martine.oger@cea.fr](mailto:martine.oger@cea.fr). (U.E. : délai de 24 h, hors U.E. : délai de 4 jours).