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Neutron-γ discrimination on the Solar Neutron Telescope at Sierra Negra, Mexico using pulse shape analysis

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Solar neutron telescopes (SNTs) were designed to observe neutrons emitted during solar flares. All SNTs consist of a number of central scintillator plates, surrounded by proportional counters or thin scintillator detectors. Incoming neutrons interact with nuclei within the scintillator and produce recoil protons. The energy of a neutron may be estimated from the light emitted by the recoil proton. Proportional counters and scintillator plates around the detector work as anti-counters to distinguish neutrons from charged particles. Considering the SNT installed at Sierra Negra, Mexico, is shielded with a 5 mm lead layer on top and 10 mm iron plates at the sides to reject background photons.

In this paper we present a method to discriminate between neutrons and γ-rays analysing the shape of the output signal from SNT's scintillators.
We also present the results of the experiment performed to validate this technique, taking advantage of the SNT's capacity to reject low energy γ-rays.

Collaboration

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Primary author: ANZORENA MÉNDEZ, Marcos Alfonso (Instituto de Geofísica, Universidad Nacional Autónoma de México)

Co-authors: Prof. OSHIMA, Akitoshi (College of Engineering, Chubu University); Mr HURTADO PIZANO, Alejandro (Instituto de Geofísica, Universidad Nacional Autónoma de México); Prof. KATO, Chihiro (Department of Physics, Shinshu University); LOPEZ, Diego (Nagoya University); ORTIZ, Ernesto (Instituto de Geofísica); Dr TUSHIYA, Harufumi (Japan Atomic Energy Agency); Prof. KOJIMA, Hiroshi ((Faculty of Engineering, Aichi Institute of Technology); Prof. TAKAMARU, Hisanori (College of Engineering, Chubu University); Prof. VALDÉS--GALICIA, José Francisco (Instituto de Geofísica, Universidad Nacional Autónoma de México); Prof. MUNAKATA, Kazuoki (Department of Physics, Shinshu University); Dr WATANABE, Kyoko ((Institute of Space and Astronautical Science); Dr GONZALÉZ MÉNDEZ, Luis Xavier (SCiESMEX, Instituto de Geofísica, Unidad Michoacán, Universidad Nacional Autónoma de México); Mr BARRANTES, Marco (Instituto de Geofísica, Universidad Nacional Autónoma de México); Mr MUSALEM CLEMENTE, Octavio Felix (Instituto de Geofísica, Universidad Nacional Autónoma de México); Mr HIKIMOCHI, Rikiya (Solar-Terrestrial Environment Laboratory, Nagoya University); GARCÍA GÍNEZ, Rocío (Instituto de Geofísica, Universidad Nacional Autónoma de México); Prof. SHIBATA,

Shoichi (College of Engineering, Chubu University); Prof. SAKO, Takashi (Solar-Terrestrial Environment Laboratory, Nagoya University); Prof. KOI, Tatsumi (SLAC National Accelerator Laboratory); SASAI, Yoshinori (Nagoya University); Prof. ITOW, Yoshitaka (Solar-Terrestrial Environment Laboratory, Nagoya University); Prof. MATSUBARA, Yutaka (Solar-Terrestrial Environment Laboratory, Nagoya University)

Presenter: ANZORENA MÉNDEZ, Marcos Alfonso (Instituto de Geofísica, Universidad Nacional Autónoma de México)

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