

Pyroelectric X-ray and neutron generator for low background detectors calibration

Thursday, 8 October 2015 14:00 (15)

Pyroelectric crystals, such as LiNbO₃ or LiTaO₃ being under influence of temperature gradient produce electric field up to 106 kV/cm. It was experimentally confirmed that the crystal installed in the chamber with residual gas pressure about 1 mTorr could be used for generation of X-Ray radiation [1,2] with energy up to about 100 keV, as well as electrons [3] and neutrons with energy 2.45 MeV [4]. Due to the unique properties such as On/Off mode of operation and absence of radioactive materials such generators seems to be promising tool for calibration of neutrino and dark matter detectors. The experimental setup for the research and development of pyroelectric generators is presented.

References [1]. Brownridge, J. D., "Pyroelectric x-ray generator," *Nature*, 358, pp. 277-278 (1992). [2]. V.I. Nagaychenko, V.V. Sotnikov, B.I. Ivanov, A.M. Yegorov, A.V. Shchagin, *J. Surf. Inv. X-ray, Synch. Neutron Tech. (Russia)* 3, 81, (2007). [3]. Brownridge, J. D., and Shafroth, S. M., "Self-focused electron beams produced by pyroelectric crystals on heating or cooling in dilute gases," *Appl. Phys. Lett.*, 79, pp. 3364-3366 (2001). [4]. B. Naranjo, J.K. Gimzewski, S. Putterman, *Nature*, 434, pp. 1115-1117 (2005).

Presentation type

Section talk (10+5 min)

Primary author(s) : Dr. KUBANKIN, Alexander (Belgorod National Research University)

Co-author(s) : Mr. CHEPURNOV, Alexander (SINP MSU); Dr. SHCHAGIN, Alexander (KIPT); Mr. OLEINIK, Andrey (BelSU); Mr. IVASCHCUK, Oleg (BelSU)

Presenter(s) : Dr. KUBANKIN, Alexander (Belgorod National Research University)

Session Classification : Nuclear physics and particle physics - parallel IX

Track Classification : Nuclear physics and particle physics