

Performance of a silicon PIN photodiode based radon detector for low radioactivity environment

Thursday, May 25, 2017 2:30 PM (20 minutes)

It is very important to monitor the amount of radon (Rn-222) in the underground experiments such as rare decay and dark matter experiments with ultra low background requirements. The radioactivity from the radon can be a significant background source to the experiments and need to be measured precisely. We have upgraded a radon detector with a volume of ~70 L which was used in the KIMS (Korean Invisible Matter Search) experiment by replacing with a Hamamatsu silicon PIN photodiode and a Hamamatsu pre-amplifier. The positively charged radon's daughter particles (Po-214 and Po-218 mostly) produced in the air of the detector chamber are collected by the photodiode in a negative high voltage. The energy resolutions of alpha particles emitted from the decays of the daughter particles are measured to be better than 0.6% with very clean signals to be identified. We also have had about 3 months of data with the air sealed after closing the chamber. The half-lifetimes of Rn-222 from two daughter particles measured together with the background level of the chamber are going to be presented.

Primary author: Mr SEO, Kyungmin (CUP)

Co-authors: Dr HA, Chang Hyon (Institute for Basic Science); Mr PARK, Chanwoo (Kyungpook National University); Dr LEONARD, Douglas (IBS Center for Underground Physics); Dr JEON, Eunju (Institute for Basic Science); Prof. KIM, Hongjoo (Kyungpook National University); PARK, HyangKyu (ibs); Mr KIM, Hyoung gyu (Institute for Basic Science); Prof. KIM, Hyunsoo (Sejong University); Dr LEE, Hyunsu (Institute for Basic Science); Dr LEE, Jaison (CUP/IBS); Dr PARK, Jung sic (Institute for Basic Science); Dr LEE, Moo Hyun (IBS); Dr LEE, Myoung seop (VIGS corporation); Dr KIM, Nam young (Institute for Basic Science); Mr JANG, Sang Chul (Seoul National University); Dr OLSEN, Stephen (CUP); Dr KIM, Sung hyun (Institute for Basic Science); Mr KIM, Woo tae (Institute for Basic Science); Prof. KIM, Yeongduk (Institute for Basic Science); Dr KIM, Yong hamb (Institute for Basic Science); Dr YOON, Young soo (Institute for Basic Science)

Presenter: Mr SEO, Kyungmin (CUP)

Session Classification: Poster Session