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Photon counting detector for the personal radiography inspection system "SIBSCAN"

The current situation with international terrorism and drug smuggling generated a need for mass screening of the peoples for a detection of the illegal items hidden in the clothes or inside of a human body. At present time, the single way to do it effectively is a radiographic inspection. Due to the need of examination of a lot of healthy people the system should operate at the lowest possible dose defined by physical limits and the local regulations. More than 10 years ago the digital scanning radiography system based on multistrip ionization chamber was suggested in the Budker Institute of Nuclear Physics.
The last modification of the system operates with the detector filled with pure Xe at 15 bar, having quantum efficiency 70% and a pitch of channels 1.5 mm. The detector demonstrates excellent radiation resistance and its parameters stability after 5 year operations at a load up to 1000 persons per day. Currently, the installations operate in several Russian airports and at subway stations in some cities.
At present time we design a new detector operating in direct photon counting mode having superior parameters than gas one, based on assemblies: scintillator - SiPM. The detector prototype has close to zero noise, higher quantum efficiency and count rate capability more than 5MHz per channel (20% decreases) that leads to better image quality and improved detection capability.

Author: POROSEV, Vyacheslav (Budker Institute of Nuclear Physics)

Co-authors: Dr GRIGORIEV, Dmitry (Budker Institute of Nuclear Physics); Prof. BARU, Semen (Budker Institute of Nuclear Physics); OLEYNIKOV, Vladislav (Budker Institute of Nuclear Physics)

Presenter: OLEYNIKOV, Vladislav (Budker Institute of Nuclear Physics)

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