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## Miniaturized Fully Spectroscopic Radiation Camera based on Timepix3 chip for tracking of radioactive sources and monitoring of space weather

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The excellent features of the state-of-the-art particle tracking hybrid detectors Timepix3 have been already shown. They are namely: High granularity (256 x 256 pixels with a pitch of 55  $\mu\text{m}$ ), spectral and temporal sensitivity. These detectors can be coupled with high-Z sensors such as CdTe, CZT or GaAs. The Timepix3 properties allow for suppression of secondary radiation generated inside of high-Z sensors (CdTe) such as internal XRF or Compton effect.

The new simplified, miniaturized and networkable version of Timepix3 based detector was developed under the name MiniPIX TPX3. The main parameters are: low power consumption, low weight, the possibility of local data processing of every detected particle (integrated ARM CPU and FPGA), all in a size of a bit larger USB flash drive.

Thanks to its flexibility and small size, it perfectly fits for the monitoring of tight and/or complicated radiation environment. Extended with suitable collimator makes it a perfect small-sized gamma camera. These are all reasons why this solution was chosen for ongoing projects (observation of migration of the radioactive sources in the soil or particle tracker for the monitoring of the space weather).

The features of MiniPIX TPX3 with various sensor materials and thicknesses were tested and evaluated in terms of spectral sensitivity, long term stability, and imaging performance. Special effort was spent to test gamma camera with various kinds of pinhole/multi-pinhole collimators

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