

# Geant 4

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## The highly miniaturised radiation monitor

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The highly miniaturised radiation monitor (HMRM) is a simple particle detector being developed for wide application on satellites in a broad range of orbits. The HMRM is a collaborative effort between the STFC Rutherford Appleton Laboratory and Imperial College London, aimed at addressing ESA's radiation monitoring strategy in the category of small, versatile, devices intended for alert and safeing functions and for support to platform and payload systems.

The HMRM uses an arrangement of silicon active pixel sensors to detect and identify electrons with energy 0.05 – 6.0 MeV and protons with energy 1.3 – 300 MeV. Individual particles are identified within the monitor, in real time, by measurement of the energy deposits in the sensor array. Species-specific dose measurements and particle energy spectra are produced, allowing in-flight assessment of danger to spacecraft operation and instrumentation posed by the radiation environment.

The low energy detection thresholds, together with the small volume and mass are potentially a significant improvement on existing radiation monitors.

We will present the methodology and GEANT4 simulations which were used to guide the HMRM design process and discuss its simulated performance in reconstructing realistic particle fluxes.

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