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Compton Camera Imaging for Environmental Purposes

Tuesday, 14 September 2021 10:00 (30 minutes)

On 11th March 2011 the Fukushima Daiichi nuclear power plant suffered major damage after being hit by a magnitude 9 earthquake and subsequent tsunami. This resulted in a major radionuclide release to the environment. In response to this, remediation of the surrounding agricultural land commenced.

Part of the scientific focus is on understanding the dynamics of 137Cs, in terms of plant uptake and retention in soils. Accurate quantification of activities for sources whose distributions vary spatially and temporally is required.

At the University of Liverpool, UK we have characterised the near-field response of our Compton camera Gamma-Ray Imager (GRI) system to enable accurate estimation of 137Cs activity and its location.

The ability to precisely determine activity and distribution at small scales (sub-cm resolution in a sub-metre phase space) is considered to have applications beyond studying the dynamics of radiocaesium in environmental media.

At present, activity can be reliably estimated from the event rate for point-like sources, and a method to derive activity for distributed sources from the reconstructed Compton images is in development.

The characterisation and validation study of the system performance will be presented.

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