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Next Generation Germanium Systems for Safeguards Applications

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We are developing the latest generation of highly portable, mechanically cooled germanium systems for safeguard applications. In collaboration with our industrial partner, PhDs Co, we have developed the Germanium Gamma Ray Imager (GeGI), an imager with a 2π field of view. This instrument has been thoroughly field tested in a wide range of environments and have performed reliably even in the harshest conditions. The imaging capability of GeGI complements existing safeguards techniques by allowing for the spatial detection, identification, and characterization of nuclear material. Additionally, imaging can be used in design information verification activities to address potential material diversions. Measurements conducted at the Paducah Gaseous Diffusion Plant highlight the advantages this instrument offers in the identification and localization of LEU, HEU and Pu holdup. GeGI has also been deployed to the Savannah River Site for the measurement of radioactive waste canisters, providing information valuable for waste characterization and inventory accountancy. Measuring 30×15×23cm and weighing approximately 15kg, this instrument is the first portable germanium-based imager. GeGI offers high reliability with the convenience of mechanical cooling, making this instrument ideal for the next generation of safeguards instrumentation.

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