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Nuclear Waste Imaging and Diversion Monitoring using Muon Scattering Tomography

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In addition to imaging an object, muon scattering tomography (MST) benefits from providing additional information, i.e. the Z of the scattering material, when interrogating the object. MST's potential therefore to image the material inside nuclear waste drums is well-established. Here the technique is extended, using machine learning methods, to provide quantifiable metrics for in-drum material identification. The methods thus developed and the results obtained for a series of nominal material types and shapes in a simulated drum are presented. Results using the MST technique to determine whether or not materials have been diverted or replaced in the drum will also be presented.

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