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Use of Generative Adversarial Neural networks in muography

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Many muon imaging algorithms require large amounts of simulated data to infer the densities and geometries of the objects under study. A typical muography simulation can be factorized in three different aspects: simulation of the initial muon flux, simulation of the propagation of the muons through matter, and simulation of the detector response. In this work we present how Generative Adversarial Neural networks can be used to replace each of these simulation stages in a fast but still realistic way. We will show how these networks are able to interpolate new geometries never provided in the training phase. Results are applied to several cases of scattering muography applied to the industrial sector.

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