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**Calculation for imaging unknown objects by cosmic-ray muons**

YUEKUN HENG, MENGZHAO LI, Institute of High Energy Physics — Cosmic-ray imaging is a nondestructive detection technology that is studied to detect unknown objects. Transmission and scattering imaging schemes are investigated. The transmission scheme uses a multilayer detector to measure the direction of a cosmic ray passing through an object. The scattering scheme involves placing two detectors upstream and downstream of the cosmic ray to record the incident and exit directions of the muon passing through the object. The effect of the detector resolution on the imaging clarity of transmission imaging is studied. The applicable scenarios of the two schemes are analyzed. The calculation results show that transmission imaging of hundred-meter objects can achieve a spatial resolution of 2.5 m and a density resolution of 1.1 g/cm<sup>3</sup>. Scattering imaging is mainly suitable for meter-level objects, and a 0.1 m chamber and heavy metals in rock can be distinguished.

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