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From muography to muon tomography of large structures

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Muography is a penetrating imaging technique making use of the natural cosmic muons to probe the inside density distributions of objects. Since the pioneering work from Luis Alvarez in the 1960s, different imaging modes have been implemented depending on the size of these objects. The most common and only usable one for very large structures is the so-called transmission muography, where the image is obtained from muons which passed through the structure. This image is by nature a 2D density distribution, the density along the direction of observation being integrated. This situation is very similar to medical imaging, and a 3D picture can be accessed by combining different projections. In this case, however, the size of the objects as well as the modest number of available projections impose several challenges to this inverse problem. Following a previous work on absorption muography, a SART algorithm was successfully applied on simulated transmission data. This talk will review the various challenges of this inversion and how they were addressed. By the time of the conference, new results should be released from the ScanPyramids collaboration, and the application of the SART algorithm to the CEA data will then be shown.

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