

## Stability monitoring of historical buildings with a cosmic ray tracking system

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Cosmic ray radiation, thanks to its high penetration capability and relative abundance, has been successfully used both in scientific studies and civil applications. We investigated, for the first time, the possibility of using cosmic ray radiation for the static monitoring of historical buildings, where severe conservation constraints apply and the time evolution of the deformation phenomena under study could be of the order of months or years. In this talk, we present the results of a feasibility study performed by means of Monte Carlo (MC) simulations, using the wooden vaulted roof of the “Palazzo della Loggia” in the town of Brescia (Italy) as a relevant case study. The results, based on a scintillating fiber detector, showed that horizontal displacements of the order of 1 mm could be detected with a week of measurement. Finally, as a proof of principle, we also developed a small-size detector prototype consisting of layers of scintillating fibers coupled to silicon photomultipliers. The first experimental results and their comparison to MC simulations are also presented.

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