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DEFORMATION MEASUREMENT OF THE ATLAS CAVERN AT CERN

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Abstract

Caverns for large physics detectors as the one for the Large Hadron Collider experiments sit nearly 100 m underground and measure several tens of meters in length, width and height. The deformation of the cavern ground slab over decades has a direct influence on the relative alignment of detectors to the accelerator. The expected long-term movements are larger than the fine adjustment of detectors and accelerators. In this paper, the measured deformations of the ATLAS experiment main cavern floor and lateral walls over more than 15 years have been analysed. The measurement series have been performed in varied time intervals getting down to half a year. The measurement techniques such polar method (total station and laser tracker) and precise levelling allow to obtain sub-millimetre precision. The measured deformation reaches values up to 5.0 mm for the ground slab and it is significantly (four times) lower compared to the predictions of the civil engineering consultants at the moment of the cavern construction. For the lateral walls they reach up to 14.7 mm.

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