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Underground muography at Buda Castle

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The Buda Castle is the largest underground muography project of Wigner Research Centre for Physics, and one of the major ones worldwide. The project has been running for more than four years, and we have about the same period until completion. The research area is the southern part of the hill of Buda Castle, Budapest, where the present castle and the partly buried ruins of the ancient ones are located.

The goal is to find every unknown underground void (caves and tunnels) which characteristic extent is larger than $2 \times 2 \times 2 \text{ m}^3$, as well as to find the zones with significantly lower density than the surrounding base rock (back-filled tunnels, rock debris zones, etc.). During the project we investigate the whole area which can be reached from the presently known underground facilities. Most of these facilities are in ideal depth, about 50m below the surface, and the corridor system available for measurements is dense enough to populate an appropriate measurement grid for making even 3D inversion for the uppermost 30m for almost the whole Castle area.

Thanks to the wide range of the excellent quality detectors developed and built by the Wigner RCP, we can measure with good efficiency even from places which are difficult to reach. Depending on the phase of the project the number of continuously used detectors varies between 2 to 5.

This presentation will introduce the project and the first results obtained by 3D triangulation and inversion algorithms based on several dozens of already completed measurement points.

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