**Novel installation of fast cameras at tokamak GOLEM**

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Tomographic inversion of radiation [1] determines spatial distribution of tokamak plasma radiation sources [2] using line integrated plasma projections data. For measurements of the projections, fast visible radiation matrix cameras became broadly applied on tokamaks in recent past. These novel cameras opened new possibilities in high temperature plasma studies [3].

The tokamak GOLEM [4] of the Czech Technical University in Prague strives to implement up-to-date diagnostics with enhanced temporal and spatial resolution. Therefore, a novel diagnostic system of two crossed monochrome cameras Photron FASTCAM MINI UX 50 with a Maximum Frame Rate of 160,000 fps (1280 x 8 pixels) in 12-bit ADC dynamic range [5] was integrated into the GOLEM diagnostics. The proposed contribution will detail their novel port mounts (vertical and horizontal) at the GOLEM tokamak which have been designed so that additional optical measurements of the plasma core (e.g. plasma spectroscopy) is possible.

As the main purpose of this study, we shall focus in particular on the frame rate potential which is high enough to allow detection and observation of highly transient phenomena in the GOLEM plasmas. Progress in solving specific challenges of the ill-conditioned tomographic inversion via the algorithm [6] optimisation and testing for tokamak GOLEM will be presented together with the first tomographic results. Furthermore, prospectives of implementing further inversion constraints e.g. linked to integration of another visible light diagnostic data will be discussed.

**References:**

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[5] <http://photron.com/wp-content/uploads/2015/11/Mini-UX-REV16.9.29.pdf>

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