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## 14.27 First Results from a High Time-Resolution Thomson Scattering System Applied to Pellet Fuelled Wendelstein 7-X Plasmas

Thursday, 19 April 2018 10:31 (120)

Studies of transient plasma events may reveal fast relaxation mechanisms of the plasma pressure or MHD events. A particular application specifying measurement requirements is the fuelling of fusion plasmas with cryogenic pellets. The paper describes a Thomson Scattering System, simultaneously providing electron temperature and density profiles, combining high temporal resolution and adjustable measuring times. This "burst" Thomson Scattering mode has a 10 kHz time resolution for repetitive bursts of typically 1.2 ms duration, compared to the 10 Hz standard mode. A burst can be either triggered at pre-defined times or by plasma events, for which a fast trigger logic circuit was developed. Currently, a single laser is employed emitting four laser pulses per burst. For the next campaign three lasers will be available providing twelve consecutive measurement points with 100  $\mu$ s spacing. Burst measurements of pellet series have been conducted to demonstrate the viability of the approach. The event trigger employed the H $\alpha$  emission of the pellet. Magnetic high and low field side pellet injections were compared. The assessment of potential grad-B effects did not show differences for different fuelling geometries. However, within a pellet series the deposition depth per pellet increased.

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