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14.50 Design of an Imaging Fabry-Perot Interferometer for the VEST Edge Plasma Temperature Measurement

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The ion temperature in VEST (Versatile Experiment Spherical Torus) is expected to increase with the neutral beam injection (NBI) heating and will be measured with emission spectroscopy. However, the temperature at the plasma edge still remains rather low, thus requiring a reliable spectroscopy technique with sufficient spectral resolution. Since the VEST system operates in a single pulse regime, with pulse duration of ˜ 10ms, the time resolution of about 1 ms is required. In this work a possibility of the temperature measurements by an Imaging Fabry-Perot Interferometer (I-FPI) using hydrogen and impurity emission line profile is considered. A concept design and the first results with H-alpha line obtained in the VEST are presented. The spectral resolution of I-FPI is about 15 GHz. The time-resolution has been realized using a high-speed camera. The time resolution of 1 to 10 ms has been used. The FPI fringes have been processed by a MathLabTM code. The gas temperature measured at the plasma edge is about 1 eV. In order to realize the multichannel I-FPI approach in the future, the necessary simulations (using the Light ToolsTM software) have also been performed, showing possibility of a 4 to 6 channel I-FPI for obtaining a spatial temperature profile across the plasma volume.

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