



Motional Stark Effect as magnetic field diagnostic at TEXTOR-94

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The profile of the current density in a tokamak and hence the poloidal magnetic field plays an extremely important role in the transport properties of the plasma. Examples are the observations of transport barriers, filaments, magnetic islands and improved confinement regimes, all in a way related to the specific topology of the magnetic field. A diagnostic to measure this (poloidal) magnetic field in the core of the plasma is essential for understanding and controlling the confinement of the plasma. A real-time and local measurement of this magnetic field is in principle possible by employing the motional Stark effect (MSE) experienced by energetic hydrogen atoms injected into the tokamak.

On the tokamak TEXTOR-94 a diagnostic based on MSE has been installed. This measures the complete Balmer- spectrum emitted by the excited atoms of the heating beam under two polarisation angles. This polarisation is directly related to the direction of the magnetic field. The advantages of exploiting the full spectral information are obvious: beam velocity, observation volume, absolute value of magnetic field, the plasma radial electric field and the beam density can as well be extracted from the measurement. First results will be shown.