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12.18 Design and Initial Operation of a Laser Blow-Off System on the DIII-D Tokamak

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A new laser blow-off (LBO) diagnostic was recently installed on the DIII-D tokamak to enable cutting-edge studies of both impurity and electron heat transport in reactor-relevant plasma conditions. Utilizing a high energy (up to 1.2 J), pulsed (50 Hz) Nd:YAG laser and fast, piezo-electric steering optics, this new system is capable of introducing multiple, impurity injections into a single DIII-D plasma discharge with precise timing. Control of the laser energy combined with remote control of the beam size and focus allow for arbitrary selection of both the energy density incident on coated target films and the number of ablated particles. These capabilities provide a means for efficient introduction of a wide range of target materials (Li to W) into DIII-D plasmas, enabling the study of trace, non-intrinsic, low and high-Z impurity transport. Alternatively, the system can also introduce larger, perturbing amounts of impurities that can be used for cold pulse propagation studies and validation of atomic physics data. Impurities introduced via this technique will be tracked using the suite of DIII-D spectroscopic diagnostics (SXR, CER, etc.) to better understand their transport in a range of DIII-D plasma conditions. In this presentation, we will provide a detailed descriptio

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