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The measurement of visible bremsstrahlung emissivity profiles on HL-2A

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Reliable experimental determination of the mean effective charge (Z_{eff}) is of great importance for the impurity control in high temperature plasma. The Z_{eff} is usually calculated using data from line integrated bremsstrahlung measurements, electron density and temperature profiles, and the plasma geometry. The visible bremsstrahlung emissivity profiles are achieved with the spatial resolution of 1 cm on HL-2A tokamak for the first time. Light-absorption panels that face the telescope are installed on the inner vessel wall, aiming at reducing the influence of wall reflection on the bremsstrahlung measurements. High-resolution spectrometer is used to select the impurity-line free region instead of interference filters, owing to the fact that in discharges with impurity injection or auxiliary heating power injection, some unpredicted impurity lines may invade this region, giving rise to a deviation of profile measurements. The line integrated bremsstrahlung emissivity profile evolutions are obtained under different discharge conditions, such as NBI and/or ECRH injection, L-H mode transition, and impurity injection, etc. It is found that compared to the center-peaked profile shape in Ohm discharges, NBI power gives a different profile shape with another high peak in the vicinity of $r=26\text{cm}$.

Eligible for student paper award?

No

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