

“Beam emission spectroscopy” diagnostics also measure edge fast-ion light

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Abstract.

Beam emission spectroscopy (BES) diagnostics normally detect fluctuations in the light emitted by an injected neutral beam. Under some circumstances, however, light from fast ions that charge-exchange in the high neutral density region at the edge of the plasma make appreciable contributions to the BES signals. This “passive” fast-ion D_α (FIDA) light appears in BES signals from both the DIII-D tokamak and the National Spherical Torus Experiment (NSTX). One type of passive FIDA light is associated with classical orbits that traverse the edge. Another type is caused by instabilities that expel fast ions from the core; this light can compromise measurement of the instability eigenfunction.