

Abstract Submitted for the Forty-Seventh Annual  
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Category Number and Subject:

Theory     Experiment

**Analysis of the  $D_{\alpha}$  spectra produced by fast ions in DIII-D,\***  
Y. Luo, W.W. Heidbrink, *UCI*, K.H. Burrell, *GA* – A diagnostic that measures the fast-ion distribution function through detection of the  $D_{\alpha}$  light from neutralized fast ions acquired data during the 2005 campaign. In addition to the fast ion signal, there are impurity lines, bremsstrahlung and emissions from other neutrals in the  $D_{\alpha}$  range. Background from visible bremsstrahlung and non charge-exchange impurity lines are subtracted by modulating the injected beam. Halo emission and charge-exchange impurity lines are fitted by using the method of nonlinear least squares. A bar at the exit focal plane of the spectrometer blocks bright interference from edge neutrals and injected neutrals. ELMs can devastate the spectrum by elevating the signal in the  $D_{\alpha}$  range significantly. The ELM contaminated time slices are eliminated by applying a relative and absolute criterion based on the edge  $D_{\alpha}$  signal. Pitch angle scattering and slowing down of beam ions are studied by varying the injection energy, beam angle, plasma density and electron temperature in quiescent plasma. Results are compared to classical theory.

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Oral     Poster