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Detection of Alfvén Cascades in Advanced JET Plasmas. B. ALPER, S. HACQUIN, S. SHARAPOV, JET/EFDA TEAM[1] — Advanced tokamak regimes with reversed magnetic shear and Internal Transport Barriers (ITBs) provide improved core energy confinement and are regarded as candidates for stationary operation in a fusion power plant. On JET, a close relation was established between frequency-sweeping Alfvén Cascade (AC) eigenmodes excited by energetic ions and ITB triggering events. This led to the development of a technique to determine $q_{\min}(t)$ from the clustering in time of different toroidal mode number ACs. Novel microwave techniques have been used on JET for detecting the AC eigenmodes from density fluctuations that produce an unprecedented time and frequency resolution that exceeds those achieved with external Mirnov coils. These modes are best detected with the reflectometer operating in O-mode, as an interferometer, at a frequency just above the cut-off. With this technique, ACs have been detected in high-density JET discharges with high-power NBI and significant plasma rotation and also driven by sub-Alfvénic NBI. ACs have also been found in the raw modulated signal from the JET (FIR) interferometer, facilitating their detection at higher density.

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