

# Intense geodesic acoustic-like modes driven by suprathermal ions in a tokamak plasma

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## ABSTRACT

Intense axisymmetric oscillations driven by suprathermal ions injected in the direction counter to the toroidal plasma current are observed in the DIII-D tokamak. The modes appear at nearly half the ideal Geodesic Acoustic Mode (GAM) frequency, in plasmas with comparable electron and ion temperatures and elevated magnetic safety factor ( $q_{min} \geq 2$ ). Strong bursting and frequency chirping are observed, concomitant with large (10–15%) drops in the neutron emission. Large electron density fluctuations ( $\tilde{n}_e/n_e \approx 1.5\%$ ) are observed with no detectible electron temperature fluctuations, confirming a dominant compressional contribution to the pressure perturbation as predicted by kinetic theory. The observed mode frequency is consistent with a recent theoretical prediction for the Energetic particle driven Geodesic Acoustic Mode (E-GAM).