

Abstract Submitted
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Quasi-Coherent Modes as Localized Viscous Ballooning Modes*

B. BASU, B. COPPI, T. ZHOU, MIT — The quasi-coherent mode associated with the enhanced- D_α H-Regime produced by the Alcator C-Mod machine has been observed [1] as being well localized in the deep E_r well at the edge of the plasma column and propagating in the ion diamagnetic direction in the plasma reference frame. This is explained as resulting from the excitation of a “viscous ballooning mode” with frequency close to ω_{di} , where $\omega_{di} \equiv -k_\phi c / e B_\theta n d p_i / dr$ is the ion diamagnetic frequency. The deep E_r well is shown to be responsible for the mode localization. For this we start our analysis from the model dispersion relation [2, 3], $\omega + i\gamma_\mu \omega - \omega_{di} = -\gamma_{RT}^2 + k_{stp}^2 v_A^2 + iD_m k_\perp^2 \omega - \omega_{*e}$, in a plane geometry, where γ_μ is proportional to the ion transverse viscosity, γ_{RT} is the Rayleigh-Taylor growth rate simulating the effects of the magnetic field line curvature, v_A is the Alfvén velocity, $D_m \equiv c^2 \eta / 4\pi$, η is the plasma resistivity and $\omega_{*e} \equiv c T_e / e B r_0 d \ln n / dr$ is the electron drift wave frequency. *Sponsored in part by the U. S. DOE.

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- [2] G. Ara, et al., *Annals Phys.* **112**, 443 (1978).
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