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Alfvén Cascade Quasi-modes P. SANDQUIST, EURATOM-VR Association, Chalmers University of Technology, B.N. BREIZMAN, Institute for Fusion Studies, University of Texas at Austin, S.E. SHARAPOV, Euratom/UKAEA Fusion Association, Culham Science Centre, JET EFDA CONTRIBUTORS TEAM — Alfvén Cascades are shear Alfvén type perturbations in tokamak plasmas with non-monotonic safety factor profiles. They typically exhibit an upward (rather than downward) frequency sweeping as the minimum value of the safety factor decreases in time during the discharge. The preferred direction of sweeping indicates existence of a radial potential well for the upward sweeping eigenmodes, as opposed to a potential hill for the downward sweeping perturbations. The hill-to-well transition appears as frequency rollover in Alfvén Cascade observations in JET plasmas, in which the "hill" modes occupy a broad frequency band, which shrinks occasionally to a narrow spectral line. In this work, we interpret recent JET data on such a rollover in low-frequency Alfvén Cascades in terms of Alfvén Cascade Quasi-modes that arise on the potential hill and stay there transiently prior to damping at the Alfvén continuum resonance. We calculate the lifetime of Quasi-modes and compare relative roles of three factors that determine their minimum frequency: geodesic acoustic coupling, pressure gradient effect, and energetic ion effect. Discharges with high power ICRH and NBI show that energetic ions with large orbits can alter the minimum frequency significantly.

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