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Revisiting the Physics of Long - Short Interaction[1] P.H. DIAMOND, N.T. KATT, G.T. KATT, Univ of California - San Diego, CMTO, CASS and CER — An important example of disparate scale interaction in confined plasmas is that of the interplay of larger scale drift wave turbulence with smaller scale ETG turbulence. Here, we examine electron heat avalanches in the presence of both drift wave and ETG activity. We explore: i.) the rapid release of ETG to the passage of a larger scale avalanche. The ETG has the effect of limiting the sharpness of the crest of the avalanche by switching on rapid parasitic transport. This suggests that should the profiles be close to ETG marginality, the small scale modes will sharply inhibit the penetration of drift wave avalanches into that zone. Transport will occur primarily via the ETG, on the tilted crests of the large scale drift wave avalanches. ii.) the interplay of two response times (drift wave and ETG) relating the instantaneous and mean heat fluxes. In particular, the instantaneous flux can relax to mean flux on either of the (faster) ETG time scale or the (slower) drift wave time scale, depending on which is excited. These combine to yield a multi-time-scale telegraph equation for the heat avalanche.

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