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**L-H Transition Dynamics and Power Threshold Minimum**[1]
MIKHAIL MALKOV, PATRICK DIAMOND, UCSD, KAZUHIRO MIKI, JAEA, Kashiwa, Japan, GEORGE TYNAN, UCSD — The link between the microscopic and macroscopic attributes of the LH transition and their effect on power threshold scaling are investigated. Emphasis is placed on understanding the minimum in the power threshold. By extending a numerical 1D model to evolve electron and ion heat fluxes separately, we propose and examine the explanation that: (i) the initial trend of decrease in the power threshold with density is due to stronger collisional electron-to-ion heat transfer which enables the development of stronger diamagnetic electric field, crucial to the transition, (ii) the subsequent increase in the threshold is due to the increase in damping of shear flows with ion collisionality. Our studies reveal a power threshold minimum in density scans which is particularly pronounced for an electron heating dominating at low densities. The heating mix is important to the transition, again pointing to the interplay of electron-ion coupling. The model also demonstrates: (a) an increase in threshold power for off-axis electron heat deposition. This follows from the reduction of the transfer of energy from electrons to ions within a confinement time, (b) the absence of a clear threshold minimum for pure ion heat deposition.

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Mikhail Malkov
UCSD

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