Gyrokinetic analysis of pedestal transport

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Surprisingly, basic considerations can determine which modes are responsible for pedestal energy transport (e.g., KBM, ETG, ITG, MTM etc.). Gyrokinetic simulations of experiments, and analysis of the Gyrokinetic-Maxwell equations, find that each mode type produces characteristic ratios of transport in the various channels: density, heat and impurities. This, together with the relative size of the driving sources of each channel, can strongly constrain or determine the dominant modes causing energy transport. MHD-like modes are not the dominant agent of energy transport - when the density source is weak as is often expected. Drift modes must fill this role. Detailed examination of experimental observations (with an emphasis on DIII-D case), including frequency and transport channel behavior, with simulations, demonstrates these points. Work supported by US DOE under DE-FC02-04ER54698, DE-FG02-04ER54742 and DE-FC02-99ER54512 and by Eurofusion under grant No. 633053

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