Comparing pedestal structure in JET-ILW H-mode plasmas with a model for stiff ETG turbulent heat transport

A predictive model for the H-mode pedestal electron temperature profile is described and results compared with JET-ILW pedestal structure. The model is based on a scaling for the gyro-Bohm normalised, turbulent electron heat flux $q_e/q_{e,gB}$ resulting from electron-temperature gradient (ETG) turbulence, derived from results of non-linear gyrokinetic calculations using GENE for the steep density gradient region of a range of JET-ILW pedestals. Using the local temperature gradient scale length L_{T_e} of each simulation in the gyro-Bohm normalisation, rather than the constant major radius R, the scaling of $q_e/q_{e,gB}$ can be represented by a single, unified scaling with the parameter $\eta_e = L_{T_e}/L_{n_e}$, which is consistent with that found in similar study on DIII-D [W. Guttenfelder, Nucl. Fus. **61** (2021) 056005]. Using this scaling, together with a prescribed density profile, to determine the value of R/L_{T_e} required to maintain a constant electron heat flux across the pedestal, allows calculation of the pedestal T_e profile. Reasonable agreement between the measured and predicted profiles is found for several different cases, providing a natural explanation of the relative widths and shifts of the T_e and n_e profiles. Other cases e.g., at very low gas fuelling rates, show disagreement, indicating conditions where other turbulence branches might dominate the heat transport.