

Investigation of Methods and Uses of Auxiliary Heating in ITER-FEAT

Patrick Byrne

APPH 4990: ITER Seminar Project Proposal

Columbia University

Even in the burning plasma regime, ITER-FEAT will require constant flux of heating power. This power can come from a variety of sources, including electron cyclotron resonance-tuned radio frequency radiation (ECRH & ECCD), ion cyclotron RF (ICRH), lower hybrid waves (LHCD) and beams of fast neutrals (NBI). In addition to their role in steady state maintenance of the burning plasma, each method of heating can be used in one or many of the following critical application: current ramp, reaching burnthrough, arriving at the L/H mode transition, controlling a variety of instabilities (ELM, Sawtooth, MHD), and modification of temperature and current profiles¹.

This project will provide a brief synopsis of the current state of the art in plasma heating. The physics of each method will be explained, and the applications to which each method is most suited will be illustrated. Experiments which have used one or more of these heating methods, and the results derived will be discussed. Finally, the preceding information will be related to the successful operation of the ITER experiment.

1 J. Jacquinot et al. "Chapter 6: Plasma auxiliary heating and current drive"
Nuclear Fusion, Vol. 39, No 12 (1999)