



IAEA FEC 2014

Contribution ID: 603

Type: Poster

Kinetic Integrated Modeling of Burning Start-up Phase in Tokamaks

Thursday 16 October 2014 14:00 (4h 45m)

In order to self-consistently describe the start-up phase of burning plasmas in the presence of energetic particles, we have developed a kinetic integrated tokamak modeling code TASK3G. This modeling is based on the behavior of the momentum distribution function of each particle species. The time evolution of the momentum distribution function is described by an advanced Fokker-Planck component TASK/FP. The burning start-up of ITER plasmas with multi-scheme heating and current drive is studied including radial transport and fusion reaction rate calculated from the momentum distribution function. The dependence on heating scheme, heating power and start timing has been studied and the optimum condition for the reduction of heating power is discussed.

Country or International Organisation

Japan

Paper Number

TH/P6-4

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Session Classification: Poster 6