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# ELMs Dynamics Simulations Based on Bifurcation Approach

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The ELM phenomenon in fusion plasma is studied based on bifurcation concept. Three field transport equations including thermal, particle and toroidal momentum transports are solved simultaneously, resulting in the spatio-temporal prediction of plasma pressure, density, and toroidal momentum profiles. The transports include both neoclassical and anomalous effects with the velocity shear dependent suppression effect acting on only the anomalous channel. The results show plasma pressure, density and toroidal momentum profiles versus time and radius. It is found that the plasma can transit to H-mode once the threshold power is reached, resulting in the formation of an edge transport barrier. A peeling-ballooning model of edge localized mode, ELM, is included in form of thermal loss once the critical pressure gradient and current density has been reached. Frequency and amplitude of ELMs are investigated. The results exhibit ELMs phenomenon in which a periodically drop of pressure, hence a loss of energy can be observed. It is also found that changing of other model variables affect frequency and type of ELMs. This research is supported by TSRI Fundamental Fund project number 91526.

**Author:** Mr KLANURAK, Danis

**Co-authors:** CHATTHONG, Boonyarit (Division of Physical Science, Faculty of Science, Prince of Songkla University); DANG-IAD, APISIT (Prince of Songkla University)

**Presenter:** Mr KLANURAK, Danis

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