Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Various heat loads to ITER divertor and nearby components during normal ELMs operation.[1] VALERYI SIZYUK, AHMED HASSANEIN, Purdue University — The anticipated power increase in ITER and other future tokamaks will increase the power flux on the divertor plates during transient events beyond a critical value that causes surface vaporization, ionization, and development of a secondary plasma from the divertor materials. The generated secondary plasma will evolve around the strike point, intensifying, expanding into the SOL, and intercepting the remaining incoming transient disrupting and ELM particles. The collisions of the incident core particles with the secondary dense plasma and the deflected/scattered energetic particles under the strong modified magnetic field structure can lead to significant energy transfer to nearby component surfaces. Our comprehensive HEIGHTS 3D simulation using the initial magnetic field equilibrium configuration of exact ITER design showed intense heat flux on the outboard strike point for wide range of ELM parameters causing formation of mini-plasma. Subsequently, the incoming core plasma particles, collide and scatter from this dense plasma, transfer part of their kinetic energy in this evolving secondary plasma. It follows to the changing of hydrodynamic evolution and depositing the remaining energy as particle showers on various nearby components causing unexpected damage.

[1]This work was partially supported by the Department of Energy, Office of Fusion Energy Sciences

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Date submitted: 29 Jun 2020 Electronic form version 1.4