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Secondary radiation effects during transient events on ITER divertor and nearby hidden components[1] AHMED HASSANEIN, VALERYI SIZYUK, Purdue University — The secondary plasma developed as a result of disruptions and ELMs on divertor plate is composed mainly from high-Z divertor materials. This mini-plasma will greatly increase the radiation flux to nearby and hidden components. Our simulations showed significant increase in radiation fluxes and heat loads in the high-Z (i.e., tungsten) generated secondary plasma. These radiations could seriously damage hidden nearby components such as umbrella and dome structure. We have implemented enhanced models in our comprehensive integrated HEIGHTS package for 3D simulation of detailed photon and particle transport in the evolved secondary plasma during instabilities. HEIGHTS can simulate full 3D realistic ITER geometry, including the reflector plate, etc. to assess performance of all components resulting from plasma instabilities. HEIGHTS predicted, for the first time, details of heat loads and temperatures evolution of all nearby components due to transient events. Secondary radiation evolution and expansion cause serious damage to hidden internal components that were not directly exposed to DT plasma. Current ITER divertor design may require changes to mitigate such effects and protect interior components that is hard and costly to repair in case of transient disruptive events.

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