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Calculation of Divertor Thermal Response as a Function of Material Composition for NSTX[1] MICHAEL CHAFFIN, Reed College, RAJESH MAINGI, Oak Ridge National Laboratory — Present tokamak designs use a magnetic divertor to deposit heat from the edge plasma onto Plasma Facing Components (PFCs) designed to remove the heat. Studying how this heat is distributed under various discharge conditions gives insight into how heat deposition can be optimized, and how different materials respond to plasma heating. In the National Spherical Torus eXperiment (NSTX), infrared cameras are used to measure divertor surface temperature, from which heat flux is computed using a 1D semi-infinite slab model with constant thermal conductivity. Here, a 1D simulation of the PFCs incorporating temperature-dependent thermal properties is used to compute heat flux profiles resolved across time and tile thickness. The PFC response to a given heat flux is also computed, and comparisons of resulting temperature profiles are made for a variety of materials including ATJ graphite (presently in the NSTX divertor), pyrolytic graphite, molybdenum, and tungsten.

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