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Radiation Hydrodynamic Simulations of Laser Plasma Interactions inside Parabolic Cone Targets[1] SCOTT WILKS, ANDREW MACPHEE, GINEVRA COCHRAN, ANDREAS KEMP, SHAUN KERR, ANTHONY LINK, TAMMY MA, ANDREW MACKINNON, DEREK MARISCAL, JACKSON WILLIAMS, Lawrence Livermore National Laboratory, JOOHWAN KIM, UC San Diego — A novel target [1] for long focal length, multi-picosecond, intense short laser pulses was recently designed and fielded on the ARC short pulse laser at the NIF facility. Several diagnostics indicated that the hot electron temperatures reached in these new cone targets far exceeded (by a factor of 5) the values predicted by the usual sub-picosecond (ponderomotive) scaling with intensity. We investigate the laser plasma interaction involved and find that two major factors caused these increases in performance: first, a focusing effect (due to the cone geometry) and second, a laser-plasma effect (where the cone fills with a near-critical plasma resulting in an increase in the amount of direct-laser-acceleration[2].) Simulations of the laser plasma interaction inside the cone will be presented that help elucidate the relative importance of each factor. [1] A. MacPhee et al., "Parabolic Concentrator Targets for Increasing Intensity of Long focal Length Lasers", submitted Optics Express, (2019) [2] A. Krygier et al, Physics of Plasmas 21, 023112 (2014)

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