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Hydrodynamic Simulation of Frontal Collision of Two Identical Plane Thermonuclear Burning Waves KONSTANTIN V. KHISHCHENKO, JIHT RAS, Moscow, Russia, ALEXANDER A. CHARAKHCH'YAN, CC RAS, Moscow, Russia — A one-dimensional problem on synchronous bilateral action of two identical drivers on opposite surfaces of a plane layer of DT fuel with the normal or five times greater initial density is simulated numerically. The solution of the problem includes two thermonuclear burn waves propagating to collide with each other at the symmetry plane. A laser pulse with total absorption of energy at the critical density and a proton bunch that provides for a nearly isochoric heating are considered as drivers. A wide-range equation of state for the fuel, electron and ion heat conduction, self-radiation of plasma and plasma heating by α-particles are taken into account. In spite of different ways of ignition, various models of α-particle heat, whether the burning wave remains slow or transforms into the detonation wave, and regardless of way of such a transformation, the final value of the burn-up factor depends essentially on the only parameter $H\rho_0$, where H is the half-thickness of the layer and ρ_0 is the initial fuel density. This factor is about 0.35 at $H\rho_0 \approx 1$ g/cm^2 and about 0.7 at $H\rho_0 \approx 5$ g/cm^2.

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