On ignition of thermonuclear fuels using neutron-nuclei fusion reactions

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Abstract

Ways to reduce the neutron number density required for the ignition of D-T fuel using exothermic neutron-nuclei fusion reactions have been investigated. It has been found that improvements in particle and energy confinement times by an order of magnitude reduces the minimum neutron number density required for ignition by an order of magnitude. For example, if the particle confinement time τ_p and the energy confinement time τ_E are equal and their values are 0.03, 0.3, 3, 30 seconds, the required minimum neutron number densities are 7.0×10^{21}, 5.4×10^{20}, 6.0×10^{19}, and 6.0×10^{14} m^{-3}, respectively. Methods to achieve these densities are also indicated.

Indexed keywords

Engineering controlled terms: Deuterium; Neutrons; Tritium

Engineering uncontrolled terms: Exothermic Fusion Reactions

Engineering main heading: Nuclear Fuels