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Semi-analytical calculation of fuel parameters for shock ignition fusion

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Abstract

In this paper, semi-analytical relations of total energy, fuel gain and hot-spot radius in a non-isobaric model have been derived and compared with Schmitt (2010) numerical calculations for shock ignition scenario. in nuclear fusion. Results indicate that the approximations used by Rosen (1983) and Schmitt (2010) for the calculation of burn up fraction have not enough accuracy compared with numerical simulation. Meanwhile, it is shown that the obtained formulas of non-isobaric model cannot determine the model parameters of total energy, fuel gain and hot-spot radius uniquely. Therefore, employing more appropriate approximations, an improved semianalytical relations for non-isobaric model has been presented, which are in a better agreement with numerical calculations of shock ignition by Schmitt (2010).

Keywords: non-isobaric model, shock ignition, fast-shock ignition

For full article, refer to the Persian section