Shock-Wave Impact Thermonuclear Fusion with Liquid Metal Targets

Yeong E. Kim
Purdue Nuclear and Many-Body Theory Group
Department of Physics and Center for Sensing Science and Technology
Purdue University, West Lafayette, Indiana 47907, U.S.A.
E-mail: yekim@physics.purdue.edu

Recently, non-thermal nuclear fusion based on a thermodynamic force was proposed for experiment with ion implantation into a surface of liquid Li metal [1]. In recent experiments, anomalous enhancement of reaction rates was observed with 10~24 kev deuterons implanted on metallic Li in the liquid phase [2].

An alternative explanation is investigated based on a shock-wave impact thermonuclear fusion model. The model indicates that shock-wave can be generated by deuterons impacting on liquid Li. Energy loss mechanism are considered, and the conditions when they are not negligible are determined.

The theoretical model indicates that shock-wave enhanced fusion temperatures are possible for deuterons impacting on the surface of the liquid Li target.

1. H. Ikegami, Jpn. J. Appl. Phys. 40, 6092 (2001).
2. H. Ikegami and R. Pettersson, Bulletin of Institute of Chemistry, Uppsala University, September 2002.