

Transient Formation of Super-Explosives under High Pressure for Fast Ignition*

Friedwardt Winterberg

University of Nevada, Reno, NV 89523, USA

Reprint requests to Prof. F. W.; E-mail: winterbe@unr.edu

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Dense matter, if put under high pressure, can undergo a transformation from an atomic to a molecular configuration, where the electron orbits go into lower energy levels. If the rise in pressure is very sudden, for example by a strong shock wave, the electrons change their orbits rapidly under the emission of photons, which for more than 100 Mbar can reach keV energies. With the opacity of dense matter going in proportion to the density, the photons can be efficiently released from the surface of the compressed matter by a rarefaction wave. The so produced X-ray photons can be used for the fast ignition of a thermonuclear target.

The proposed mechanism may be also responsible for the large keV X-ray bursts observed in exploding wire arrays, which can not be explained by conversion of kinetic into thermal energy.

Key words: keV Chemistry; High Pressure; Fast Ignition.