Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

A novel setup for time-resolved X-ray diffraction for gas gun experiments CAMILLE CHAUVIN, FRÉDÉRIC ZUCCHINI, THIERRY D'ALMEIDA, JACQUES PETIT, CEA Gramat — Polymorphic phase transitions in metals have been investigated for a long time under dynamic loadings through usual dynamic compression diagnostics such as velocity and temperature measurements. Such measurements were valuable for revealing the key role of kinetic effects in most phase transition mechanisms. However, the information extracted was mostly macroscopic. Obtaining direct insight about the crystallographic structure under dynamic loadings is critical for understanding mechanisms governing shock-induced structural changes. For example, in order to evidence a mixture phase or to determine the time scale of a transition, structural information may be extremely valuable. Over the last 20 years a significant number of X-ray diffraction experiments were carried under dynamic loading, either using laboratory X-ray sources or synchrotron radiation. We are developing a novel experimental setup based on a compact High Pulsed Power generator capable of producing intense X radiation through X-pinch. This source is specifically designed for time-resolved X-ray diffraction in Bragg geometry on gas gun experiments. Promising preliminary data obtained under static conditions are presented.

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Date submitted: 30 Jan 2015 Electronic form version 1.4