Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

Time-dependent Ginzburg-Landau type Multiphase Field for description of shock-induced Phase Transition[1] TOMORR HAXHIMALI, JONATHAN BELOF, LORIN BENEDICT, Lawrence Livermore National Laboratory — Phase-field models have become popular in last two decades to describe a host of free-boundary problems. The strength of the method relies on implicitly describing the dynamics of surfaces and interfaces by continuous scalar field that enter in the global grand free energy functional of the system. We adapt this method in order to describe shock-induced phase transition. To this end we make use of the Multiphase Field Theory (MFT)[2] to account for the existence of multiple phases during the transition. In this talk I will initially describe the constitutive equations that couple the dynamic of the phase field with that of the thermodynamic fields like T, P, c etc. I will then give details on developing a thermodynamically consistent phase-field interpolation function for multiple-phase system in the context of shock-induced phase-transition. At the end I will briefly comment on relating the dynamics of the interfaces in the shock/ramp compression to the Kardar-Parisi-Zhang[3] equation.

[1]This work is performed under the auspices of the U. S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.
[2]I. Steinbach et al., Physica 94D, 135 (1996)
[3]M. Kardar et al., Phys. Rev. Let 56, 889 (1986)

Tomorr Haxhimali
Lawrence Livermore National Laboratory

Date submitted: 30 Jan 2015 Electronic form version 1.4