Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Shear shocks in fragile matter VINCENZO VITELLI, STEPHAN ULRICH, NITIN UPADHYAYA, Leiden University — Random media, like polymer networks, covalent network glasses, or grains under pressure can be viewed as elastic networks composed of springs and balls. The shear moduli of these types of materials typically vanish as the network connectivity z approaches a critical value. In this talk, I show that shear strains propagate as diffusive fronts, whose **width diverges** and whose **transverse speed of sound vanishes**, as the transition is approached. Consequently, in this regime, linear theory breaks down, giving rise to **nonlinear transverse waves**. Comparison of the analytical front profile to molecular dynamics simulations allows the extraction of the material constants of the network. Interestingly, even an **undamped network** yields a **diverging effective viscosity** caused by leaking of energy into non-affine degrees of freedom.

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Date submitted: 11 Mar 2013 Electronic form version 1.4