Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Asperities, Crack Front Waves and Crack Self Healing PANKAJ RAJAK, RAJIV KALIA, AIICHIRO NAKANO, PRIYA VASHISHTA, Univ of Southern California — We have performed petascale simulations to study nanomaterial systems capable of sensing and repairing damage in high temperature/high pressure operating conditions. The system we have studied is a ceramic nanocomposite consisting of silicon carbide/silicon dioxide core/shell nanoparticles embedded in alumina. We observe that the interaction of the crack with core/shell asperities gives rise to crack-front waves. We also study crack healing by diffusion of silica into the crack as a function of nanoparticle size and inter-particle distance. Our results are well supported by experimental observations.

Pankaj Rajak
Univ of Southern California

Date submitted: 06 Nov 2015 Electronic form version 1.4