Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Cracking the Most Luminous Supernovae: Multidimensional Simulations of Pulsational Pair-Instability Supernovae[1] KE-JUNG CHEN, Kavli Institute for Theoretical Physics, UC Santa Barbara & University of Minnesota, Twin Cities, ALEXANDER HEGER, University of Minnesota, Twin Cities, ANN ALMGREN, Lawrence Berkeley National Lab, STAN WOOSLEY, UC Santa Cruz — The extremely luminous supernovae such as SN 2006gy challenge the traditional view of core collapse supernovae, because they seem too luminous by more than one order of magnitude. Their unusual brightness might be explained by the collisions between shells of matter ejected by these massive stars at the end of their lives, so called pulsational pair-instability supernovae (PPSNe). We present the results from our multidimensional simulations of PPSNe with the state-of-the-art radiation-hydro code, CASTRO. We find significant amounts of fluid instabilities occurred during the shells apostrophe collisions and discuss how the resulting mixing affects the observational signature of PPSNe.

[1]This work has been supported by the DOE SciDAC program under grants DOE-FC02-01ER41176, DOE-FC02-06ER41438, and DE-FC02-09ER41618. and by the computing resources from MSI and NERSC.

Ke-Jung Chen
Kavli Institute for Theoretical Physics, UC Santa Barbara/
University of Minnesota, Twin Cities

Date submitted: 03 Jan 2012 Electronic form version 1.4