

Tuguldur Sukhbold – Astronomy 12/6/2017

Title: Multiply-branched Solutions of Presupernova Core Structures

Abstract: The final thousand years or so evolution in the cores of massive stars play a key role in our understanding of phenomena arising from their deaths. Whether the star explodes and leaves a neutron star, or implodes to form a black hole is largely determined by these very last phases of evolution. Employing a very fine grid of models and improved stellar physics, we found evidence for well-defined multiply-branched solutions for the presupernova structures of models in certain ranges of initial masses. This implies that two stars, with nearly identical initial conditions, can result in very different final outcomes, i.e. one star can explode easily while the other likely implodes, or if both of them explode they can produce very different mass neutron stars and explosion properties. In this talk, I will review the underlying physics and discuss its implications to our understanding of the origins of compact remnants and nucleosynthesis.