

Abstract Submitted
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Computational Study of Formation and Growth of Black Holes.

AJIT HIRA, DAVID NUNN, JOSE PACHECO, ALEXANDRA VALDEZ, AR-RICK GONZALES, EDWARDINE FERNANDEZ, Northern New Mexico College — The recent advances in physics in detecting gravitational waves call for more detailed computational research on the formation and the growth of black holes of different sizes. The focus of our work is on the formation of black holes (BHs) by the failure of Core Collapse Supernovae (CCSN). We use an adaptation of the computational techniques, based on the Tolman-Oppenheimer-Volkof (TOV) equations, used by researchers such as O'Connor and Orr to raise the maximum mass of the proto-neutron star (PNS) 32% above the cold PNS value, due to the thermal pressure support in the outer PNS core. Our calculations take into account the effects of progenitor rotations. Our models incorporate the full Boltzmann transport and the effects of multi-dimensional dynamics. We examine the implications of our results for the mechanisms for the formations of supermassive black holes (SMBH).

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