

Abstract Submitted
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The Supernova Equation of State: Potential vs. Field-Theoretical Approaches¹ CONSTANTINOS CONSTANTINOU, SUNY at Stony Brook, KEN MOORE, MADAPPA PRAKASH, Ohio University — Simulations of core collapse supernova explosions require the equation of state (EOS) of nucleonic matter for densities up to 4-5 times the nuclear equilibrium density, temperatures up to 50 MeV and proton fractions in the range 0 to 1/2. Here we compare results from two different approaches for the bulk homogeneous phase. In the nonrelativistic approach, we employ the Hamiltonian density constructed in [1] and compare results with those from a field-theoretic approach that includes nonlinear interactions involving σ , ω , and ρ meson exchanges [2]. For both approaches, we provide analytical expressions for the thermal pressure and energy in the classical and quantum limits. Our next steps are to calculate these EOS's in the presence of nuclei and to perform comparisons with the EOS of Lattimer & Swesty [3].

[1] A. Akmal, V. R. Pandharipande & D. J. Ravenhall, Phys. Rev. C. 58, 1804 (1998).

[2] H. Mueller & B. D. Serot, Nucl. Phys. A., 606 (508) 1996.

[3] J. M. Lattimer & F. D. Swesty, Nucl. Phys. A., 535 (331) 1991.

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