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Connecting heavy-ion collisions to strange dense matter in neutron stars

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Connecting neutron stars to heavy-ion collisions is essential for constraining the neutron star Equation of State and its interior structure. One such phenomenological tool is the symmetry energy expansion, which characterizes the energy difference between symmetric nuclear matter and pure neutron matter [1]. However, the usual expansion is ill-defined when strangeness is present [2]. We generalize the symmetry energy expansion to include strangeness by redefining the isospin asymmetry parameter. The current work extends [2] to cover regimes where strangeness content is out of equilibrium, which accurately predicts the beta equilibrium state of the chiral mean field model [3]. With the new expansion, we can finally connect strange dense matter with heavy ion collisions. The expansion also provides a fast surrogate for input to calculate transport coefficients (e.g., bulk viscosity), reducing costly numerical evaluations.

[1] B.-A. Li, C. M. Ko, and W. Bauer, "Isospin Physics in Heavy-Ion Collisions at Intermediate Energies", Int. J. Mod. Phys. E 7, 147 (1998).
[2] Y. Yang, N. C. Camacho, M. Hippert, and J. Noronha-Hostler, "Symmetry Energy Expansion with Strange Dense Matter", 2504.18764.
[3] V. Dexheimer and S. Schramm, "Proto-Neutron and Neutron Stars in a Chiral SU(3) Model", Astrophys. J. 683, 943, (2008).

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