

Hyperon single-particle potentials in nuclear matter by chiral forces up to N2LO

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AJ, J. Haidenbauer, and U.-G. Meißner, Phys. Rev. C 112, 065209 (2025).

in collaboration with

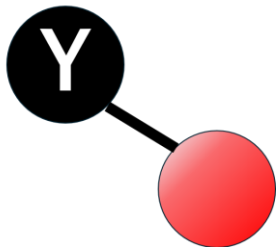
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SU(3) chiral N2LO

J. Haidenbauer et al.,

Eur. Phys. J. A 59, 63 (2023).



Brueckner-
Hartree-
Fock



Nuclear Matter

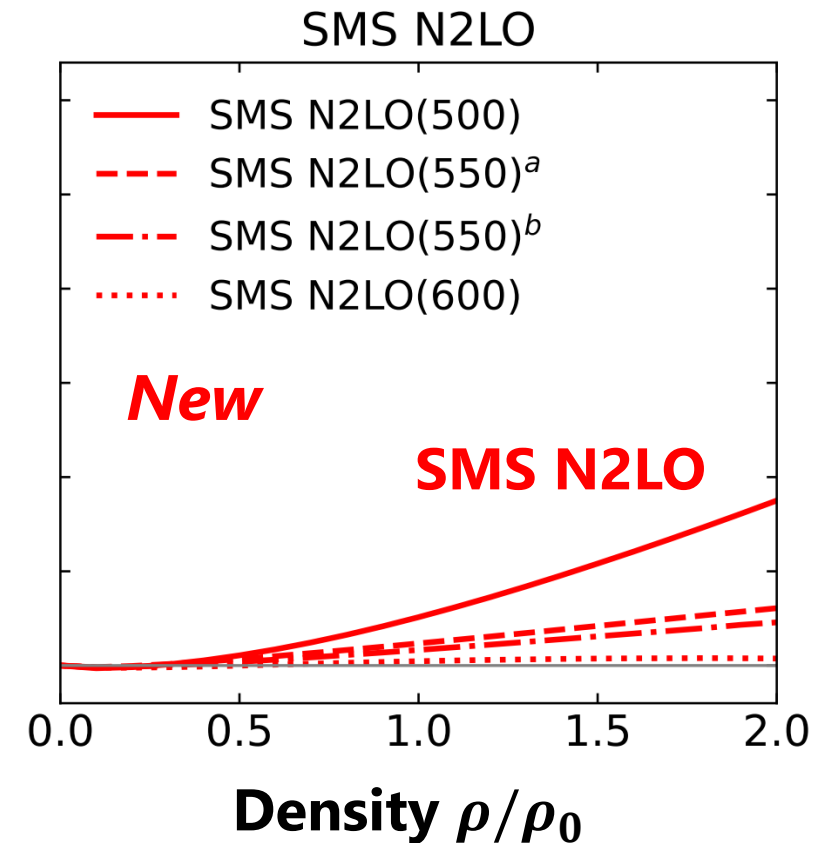
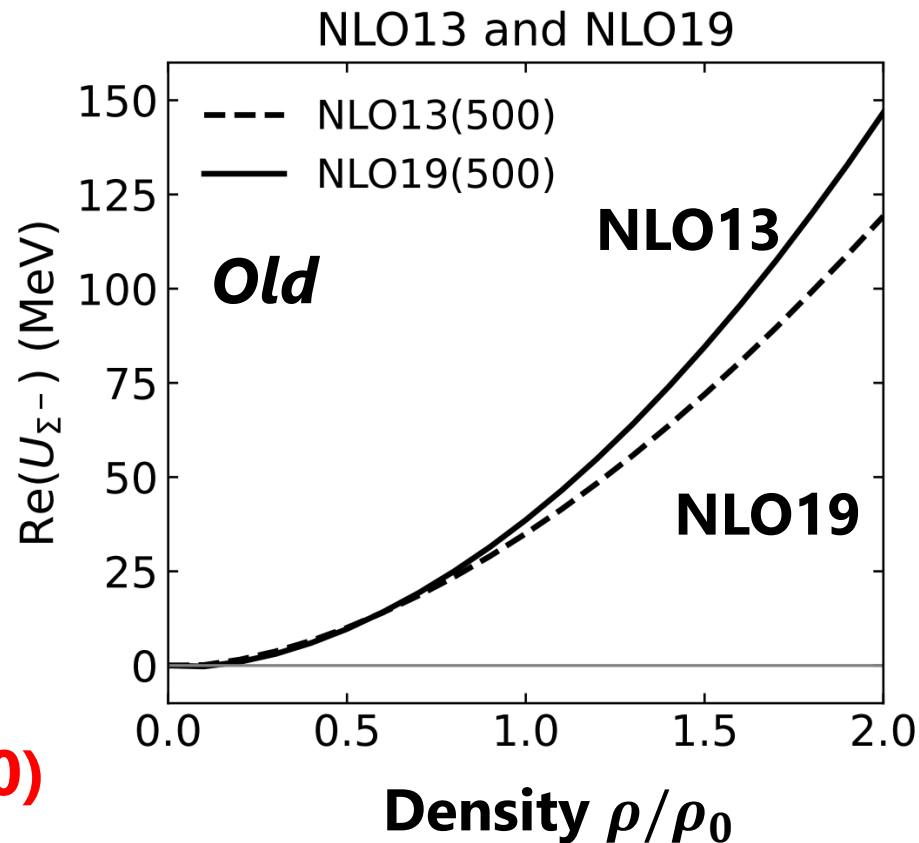
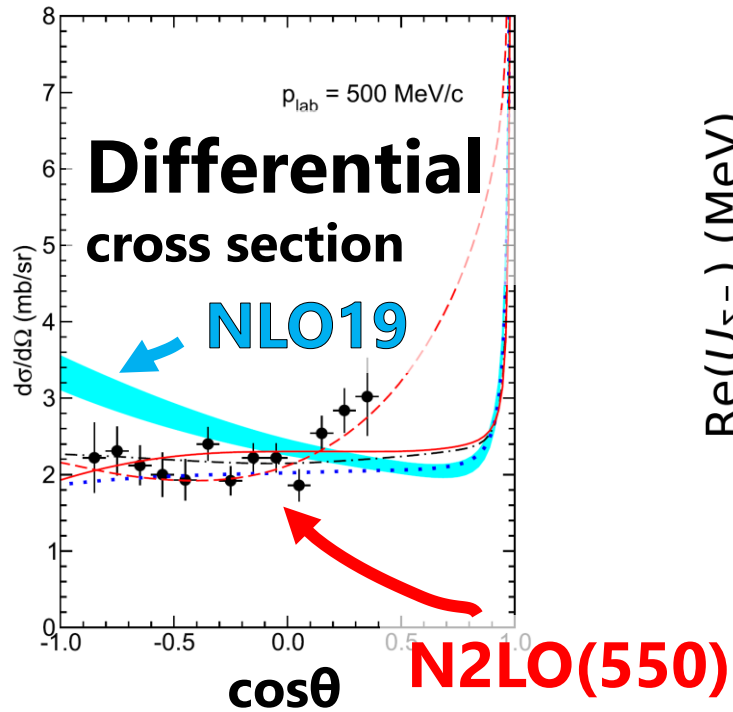


New Σ^- single-particle potentials in PNM are not so repulsive.

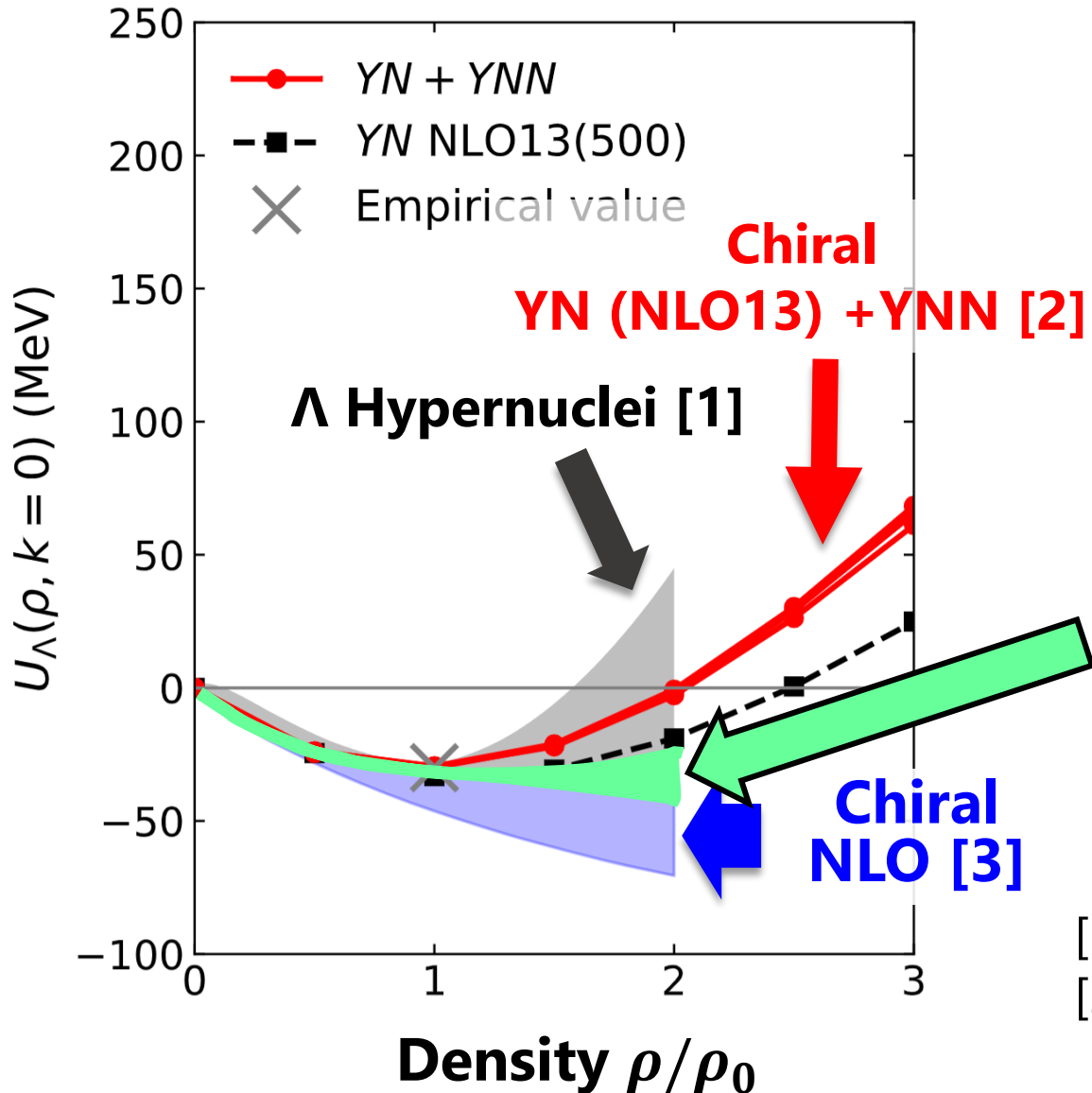
Σ^- appears in neutron stars?

J-PARC E40 (2022)

$\Sigma^+ p - \Sigma^+ p$



Λ density dependence



- There may be hyperon puzzle within baryonic matter, according to our band.

However, rigorous results can be obtained only after including YNN explicitly.

- **Hadron-quark crossover is favored?**

Overlapping region is more attractive than that by YN+YNN [2].

[1] [AJ](#) et al., PRC 108, 065803 (2023).

[2] [AJ](#) et al., PoS EXA-LEAP2024, 034 (2025).

Similar to D. Gerstung, N. Kaiser, and W. Weise (2020)

[3] [AJ](#) et al., PRC 112, 065209 (2025).