

ROCKSTAR: Towards a ROadmap of the Crucial measurements of Key observables in Strangeness reactions for neutron sTARs equation of state

Contribution ID: 3

Type: **not specified**

Lessons from Ξ^- capture events in emulsion

All five KEK and J-PARC two-body Ξ^- capture events in light emulsion nuclei to single Λ hypernuclei are consistent with Coulomb-assisted $1p_{\Xi^-}$ nuclear states. The underlying Ξ^- -nuclear potential is strongly attractive with nuclear-matter depth $V_{\Xi} \geq 20$ MeV [1], considerably larger than suggested by recent LQCD, femtoscopy and EFT theoretical studies. We argue that the J-PARC E07 new ^{14}N capture events assigned to $1s_{\Xi^-}$ nuclear states, thereby implying considerably shallower V_{Ξ} , have also another interpretation as $1p_{\Xi^0}$ nuclear states [2].

Time permitting, several other Strangeness -2 nuclear systems will be discussed briefly.

[1] E. Friedman, A. Gal, Constraints on Ξ^- nuclear interactions from capture events in emulsion, Phys. Lett. B 820, 136555 (2021).

[2] E. Friedman, A. Gal, Has J-PARC E07 observed a Ξ_{1s}^- nuclear state?, Phys. Lett. B 837, 137640 (2022).

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Session Classification: Session V