

## Mesic-nuclei bound states

Thursday, April 3, 2025 3:00 PM (20 minutes)

We study the possibility of the formation of mesons ( $K$ ,  $D$ ,  $B$  as well as  $\phi$ , charmonia, and bottomonia) bound in atomic nuclei.

The open strange and open heavy flavor mesic-nuclei are studied using the mass modifications of the mesons in nuclear matter within the quark meson coupling model [1,2].

The hidden-flavor ( $\phi$ ) meson-nucleus bound states are studied with the mass modification of  $\phi$  meson using the tree level  $\phi K \bar{K}$  lagrangian with the in-medium masses of  $K$  and  $\bar{K}$  mesons as calculated within the QMC model.

On the other hand, masses of the hidden heavy flavor mesons are calculated using a generalized linear sigma model, due to medium modification of the dilaton field, which simulates the gluon condensates of QCD [3].

These studies are relevant for the experimental investigation of the strong interaction in the low-energy regime in understanding the low-energy meson-baryon interaction with implications in diverse fields, from the search for exotic mesic nuclear bound states, to the structure of compact astrophysical objects like neutron stars.

The upcoming PANDA at FAIR, J-PARC-E29, J-PARC-E88, and JLab experiments will be particularly significant for such studies.

[1] Arpita Mondal, Amruta Mishra, Phys. Rev. C 109, 025201 (2024).

[2] Arpita Mondal, Amruta Mishra, Phys. Rev. C 110, 055201 (2024).

[3] Arpita Mondal, Amruta Mishra, arXiv:2410.15898 [nucl-th].

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**Session Classification:** Parallel Session (B)