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Recent applications of the subtracted second random-phase approximation

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The Second Random Phase Approximation (SRPA) is a natural extension of Random Phase Approximation obtained by introducing more general excitation operators where two particle-two hole configurations, in addition to the one particle-one hole ones, are considered.

Only in the last years, large-scale SRPA calculations, without usually employed approximations have been performed [1,2].

The SRPA model corrected by a subtraction procedure [2] designed to cure double counting issues and the related instabilities has been recently implemented and applied in the study of different physical cases.

In this talk we report on the most recent results obtained by using this model. In particular, results on the dipole strength and polarizability in ^{48}Ca [3], the enhancement of the effective masses induced by the beyond-mean-field correlations [4] and the effect of two particle-two hole configurations on the monopole response [5] will be presented and discussed.

[1] D. Gambacurta, M. Grasso, and F. Catara, Phys. Rev. C 84, 034301 (2011).

[2] D. Gambacurta, M. Grasso and J. Engel, Phys. Rev. C 81, 054312 (2010); Phys. Rev. C 92, 034303 (2015).

[3] D. Gambacurta, M. Grasso, O. Vasseur, Physics Letters B 777 163–168, (2018).

[4] M. Grasso, D. Gambacurta, and O. Vasseur, Phys. Rev. C 98, 051303(R) (2018)

[5] D. Gambacurta and M. Grasso, in preparation.

Primary author: GAMBACURTA, Danilo (ELI-NP)

Presenter: GAMBACURTA, Danilo (ELI-NP)

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