

# **Status of nuclear optical potentials and future prospects**

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## **I. INTRODUCTION**

Things to include:

- r-process for motivation.
- Include multiple scattering, self-consistent Green's function methods.

## **II. PHENOMENOLOGY OF OPTICAL POTENTIALS**

Things to include:

- Form of the potential: Woods-Saxon shape, coulomb component, spin-orbit force.
- Fit strength, radii, and diffuseness of complex potential.
- Issue: fitting ambiguities, extractions to exotic regions of the nuclear chart.
- Make sure to touch on phenomenology of optical potentials in modern experimental analyses (key word is modern!)

## **III. AB INITIO OPTICAL POTENTIALS**

Things to include:

- Successes and limitations.
- Motivation: predictions for exotic region of the nuclear chart.
- Coupled cluster Green's function [1].

## **IV. THEORETICAL ISSUES**

Things to include:

- Fitting ambiguities for phenomenological potential.
- Uncertainty quantification.

## V. CONCLUSION

Summary and outlook.

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- [1] J. Rotureau, P. Danielewicz, G. Hagen, F. Nunes, and T. Papenbrock, Phys. Rev. C **95**, 024315 (2017), arXiv:1611.04554 [nucl-th].