Istituto Nazionale di Fisica Nucleare
Laboratori Nazionali del Sud

PRATICA N. 001721

Avviso di seminario

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DATA-DRIVEN UNCERTAINTY-QUANTIFIED DISPERSIVE OPTICAL-MODEL POTENTIALS

Nuclear optical-model potentials, which characterize the interaction between two nuclei in a compact and model-agnostic form, are an essential input for nuclear reaction calculations required in nuclear physics, astrophysics, cosmology, and engineering applications. Proper uncertainty quantification of the optical model is necessary to obtain reliable uncertainties on any result using the potential as an ingredient [1]. A physically consistent optical potential is also expected to be dispersive [2, 3]. Even though this feature is often neglected, due to the associated significant increase in computational complexity, it allows for an unified description of scattering and structure properties, and it is extremely useful in constraining a phenomenological optical model, especially in regions of the nuclear chart where little or no experimental data are available. The combined use of these features can bring data-driven optical potentials to a new level of accuracy and sensitivity, which reflects on subsequent theoretical calculations and makes them suitable to guide the focus of future experiments. Here, I will discuss our preliminary efforts in this direction and the perspectives of the project, which aims at the development of a beyond-spherical global dispersive optical model. References [1] C. D. Pruitt, J. E. Escher, and R. Rahman. “Uncertainty-quantified phenomenological optical potentials for single-nucleon scattering.” In: Phys. Rev. C 107.1 (Jan. 2023), p. 014602. doi: 10.1103/PhysRevC.107.014602. [2] J. S. Toll. “Causality and the Dispersion Relation: Logical Foundations.” In: Phys. Rev. 104.6 (Dec. 1956), pp. 1760–1770. doi: 10.1103/PhysRev.104.1760. [3] M. C. Atkinson. “Developing nucleon self-energies to generate the ingredients for the description of nuclear reactions.” PhD thesis. Washington University in St. Louis, 2019. doi: 10.7936/2n1j-5949.

Svolgimento Seminario
il giorno **08/01/2024** alle 15:00
Aula Azzurra - LNS.

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L'invito è esteso a tutto il personale interessato, che è caldamente invitato a partecipare.

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