Contribution ID: 21

Ab initio predictions link finite nuclei and infinite nuclear matter to nuclear forces

Friday 29 October 2021 11:05 (25 minutes)

Advances in quantum many-body methods and computing allow us to study a wide range of finite nuclei and infinite nuclear matter with realistic interaction models based on chiral effective field theory. The properties of 208Pb including the noteworthy neutron skin thickness are studied for the first time using state-of-the-art realistic nuclear forces. We introduce the robust statistical approach called history matching to explore the non-implausible predictions of 208Pb neutron skin and reveal the interesting correlations among the skin, other finite nuclei observables and nuclear matter saturation properties.

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