Canadian Association of Physicists

Association canadienne des physiciens et physiciennes

Contribution ID: **318** Type: **Oral (Non-Student) / Orale (non-étudiant(e))**

Ab initio calculations of heavy nuclei

Thursday 10 June 2021 13:15 (10 minutes)

An ab initio nuclear many-body calculation needs the nucleon-nucleon (NN) and three-nucleon (3N) matrix elements as an input. The NN matrix elements can be prepared in a sufficiently large space, while the 3N matrix elements are significantly limited. Due to the limitation, it is challenging to obtain reliable results for the system heavier than $A \sim 100$. Since we usually do not use all possible 3N matrix elements in the calculations, it is possible to reduce the required RAM by computing only the matrix elements needed. In this talk, I will present a recently proposed storage method for the 3N matrix elements. This enables us to generate the 3N matrix elements in a large space well beyond the previous limit. Also, I will demonstrate some converged calculation results of the heavy nuclei.

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Session Classification: R2-5 Theory III (DNP) / Théorie III (DPN)

Track Classification: Nuclear Physics / Physique nucléaire (DNP-DPN)