ELECTROMAGNETIC STRENGTHS IN AB-INITIO APPROACHES

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The investigation of nuclear reactions from first principles is fundamental in bridging low-energy nuclear physics with the underlying fundamental theory quantum chromodynamics. Nuclear reactions induced by electromagnetic probes are key because the electromagnetic current is well known and a clean comparison with experimental data can be performed to test the theory.
Nowadays theoretical information is not only accessible for the lightest nuclei, but novel techniques are being developed to tackle heavier nuclei with ab-initio methods. I will discuss our approach based on marrying the Lorentz integral Transform method with coupled-cluster theory [1]. Utilizing nuclear forces derived from chiral effective field theory, I will show how we can surpass previous theoretical limits in mass number (A=7) and extend studies of electromagnetic strengths to heavier nuclei, like ^{40,48}Ca and more exotic systems, like ^{22}O [2] and ^{22}C.

REFERENCES

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[2] S. Bacca, N. Barnea, G. Hagen, M. Miorelli, G. Orlandini and T. Papenbrock, Phys. Rev. C **90**, 064619 (2014).