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Towards Ab-Initio Calculations of Electromagnetic Reactions in Medium-Mass Nuclei MIRKO MIORELLI, University of British Columbia, Vancouver, Canada / TRIUMF, Canada, SONIA BACCA, TRIUMF / University of Manitoba, Canada, NIR BARNEA, Racah Institute of Physics, The Hebrew University, Jerusalem, Israel, GAUTE HAGEN, Oak Ridge National Laboratory / University of Tennessee, Knoxville, GIUSEPPINA ORLANDINI, Dipartimento di Fisica, Universitá di Trento and Istituto Nazionale di Fisica Nucleare, Gruppo Collegato di Trento, Trento, Italy, THOMAS PAPENBROCK, Oak Ridge National Laboratory / University of Tennessee, Knoxville — Electromagnetic reactions with nuclei are important in many fields of physics ranging from nuclear physics to astrophysics. The response of a nucleus to the interaction of an external electromagnetic probe is a crucial observable to test our understanding of nuclear dynamics. Until very recently, most of the ab-initio calculations of such reactions where the nucleus is broken in several pieces, were restricted to very light nuclei ($A \leq 7$). By merging coupled-cluster theory and the Lorentz integral transform method one can extend the ab-initio study of electromagnetic break-up reactions to the region of medium-mass nuclei . We first benchmark the new method in ^{4}He and then address the photo-disintegration of ^{16}O. We then move to ^{40}Ca and ^{48}Ca, and investigate the electric dipole polarizability. Preliminary results indicate a correlation between the polarizability and the neutron-skin radius of ^{48}Ca. This latter is attracting a lot of attention in nuclear physics and experiments to measure both the polarizability and the neutron-skin radius are planned/ongoing at RCNP and JLAB respectively.

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