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## Towards ab initio computations of neutrino scattering on medium-mass nuclei

*Thursday, March 18, 2021 10:05 AM (20 minutes)*

In my talk I will give an overview of the recent progress that has been made in describing neutrino-nucleus scattering within the ab-initio coupled-cluster framework. It has been successful in addressing the coherent elastic neutrino scattering on  $^{40}\text{Ar}$ . Lately, the coupled-cluster theory was combined with the Lorentz integral transform. These techniques open the door to obtaining nuclear responses (and consequently cross-sections) for medium-mass nuclei starting from first principles. A series of steps has been made in this direction. Firstly, the nuclear 1- and 2-body currents have been re-derived and checked for the case of neutrino-deuteron scattering. Afterwards, the Coulomb sum rule of  $^{16}\text{O}$  has been calculated, introducing a new technique to remove the center-of-mass contamination. Most recently, we have calculated for the first time the longitudinal response of  $^{40}\text{Ca}$ . These developments allow to extend the applicability of ab-initio methods in the field of neutrino-nucleus interactions to medium size nuclei, contributing this way directly to the neutrino oscillation program.

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