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12 years of MCAS: Multi-Channel Algebraic Scattering

Thursday 16 June 2016 08:30 (30 minutes)

The Multi-Channel Algebraic-Scattering (MCAS) method was developed in 2003 for the analysis of low-energy nuclear spectra and of resonant scattering. It continues to be used effectively for nuclear-structure studies. The MCAS approach allows the construction of the nucleon-core-nucleus model Hamiltonian which can be defined in detail (coupling to the collective modes, rotational or vibrational, diverse components of the interaction operators, nonlocal effects due to Pauli exclusion). As reported at previous CAP congresses, MCAS analyses have given good descriptions of bound states and low-lying resonant spectra of medium-light nuclei, including nuclei well off the line of stability. We are currently moving into new directions for MCAS, specifically, moving to heavier target nuclei (mass A = 18-23) and new projectiles in the scattering process, recently, the α particle. As this is an invited paper, likely having a wider audience than previous presentations, a summary of the MCAS method will be presented with emphasis on its distinctive features.

A significant feature is the way the Pauli principle is preserved, while a single nucleon interacts with a nucleus that may have filled neutron or proton shells. This we refer to as the OPP method, which will be presented in this review talk. Some of the results that have been achieved with MCAS, and already published elsewhere will be presented, and present and future plans for our collaboration will conclude this talk.

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