Uncertainty quantification of spin-parity assignments in 19Ne with ML methods

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R-matrix phenomenology is used to extract resonance parameters in compound nucleus reactions from experimental cross-section spectra. Spin-parity assignments of resonances can be difficult, with potentially ambiguous classifications and are typically left without uncertainty quantification. The aim of this work is to develop methods that evaluate and calibrate these uncertainties, enabling more reliable resonance characterisation and reducing the risk of overconfident or misleading assignments. Machine learning (ML) is used here to investigate the astrophysically significant unbound structure of 19Ne by analysing a differential cross-section spectrum for 15O(a,a)15O elastic scattering. The ML model combines convolutional neural networks (CNNs) and transformer architectures to capture local features and long-range sequence dependencies, while including epistemic and aleatoric uncertainty quantification techniques. This talk overviews the approach, uncertainty treatment, and implications for resonance analysis in compound nuclei, including predicted 19Ne spin-parity sequences with calibrated confidence values.