

Applications of AI/ML to Nuclear Reaction Data Evaluation

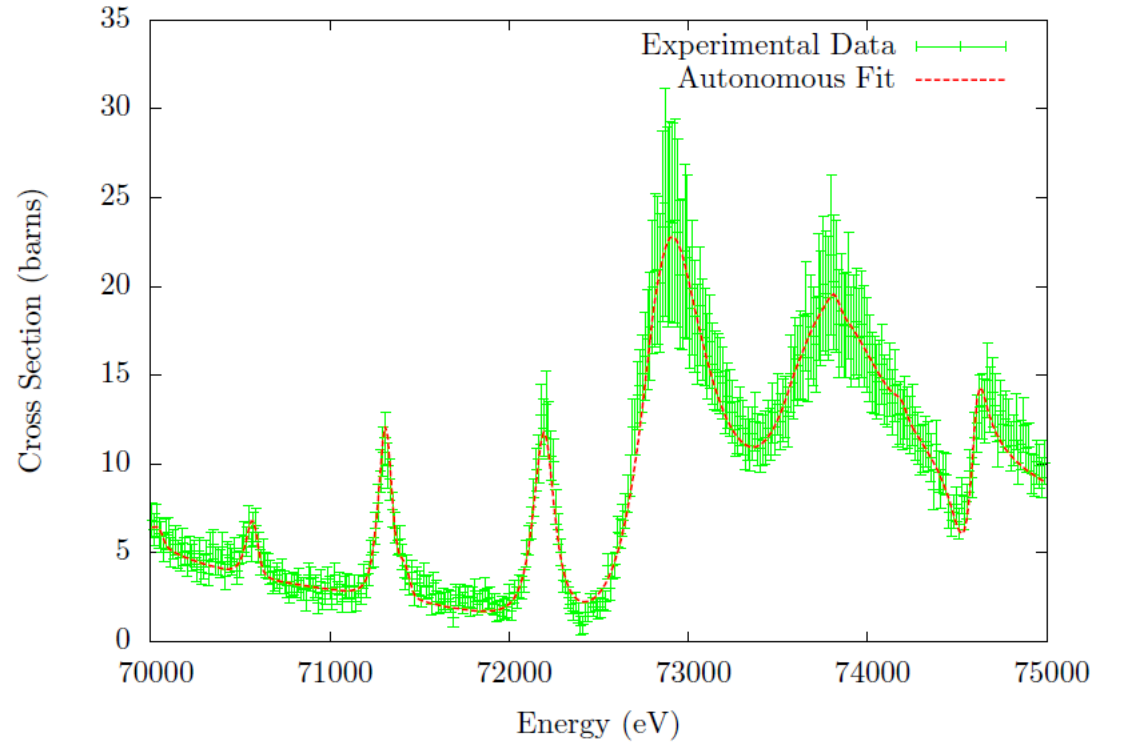
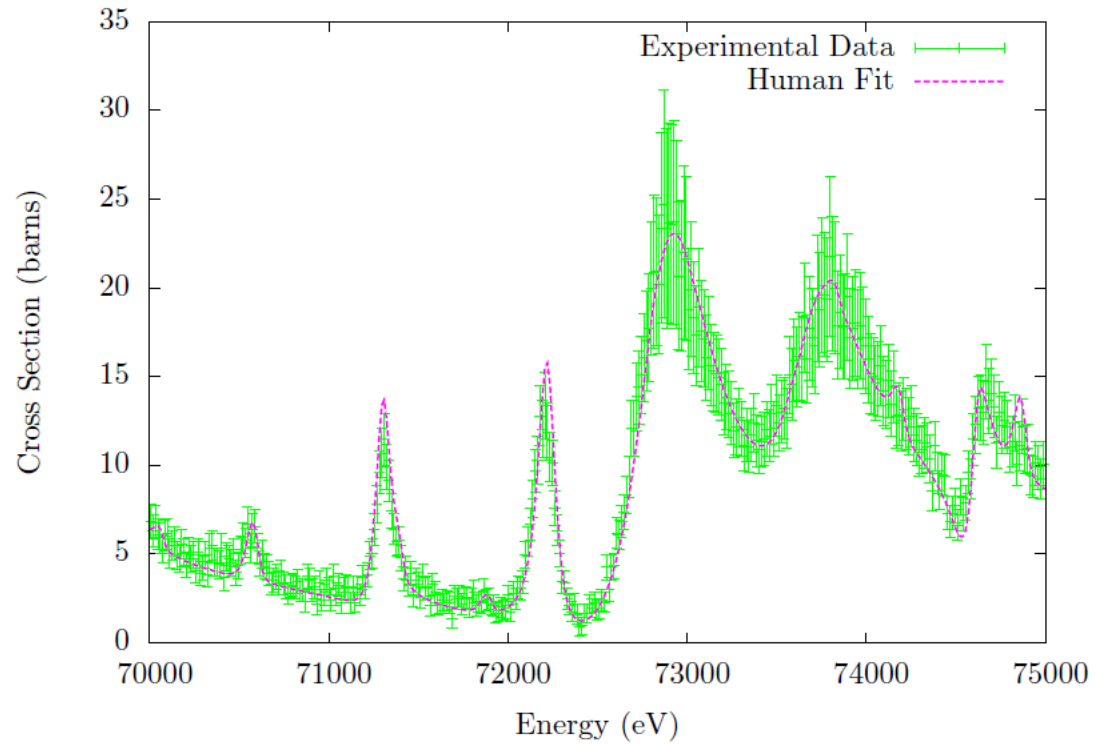
Vladimir Sobes



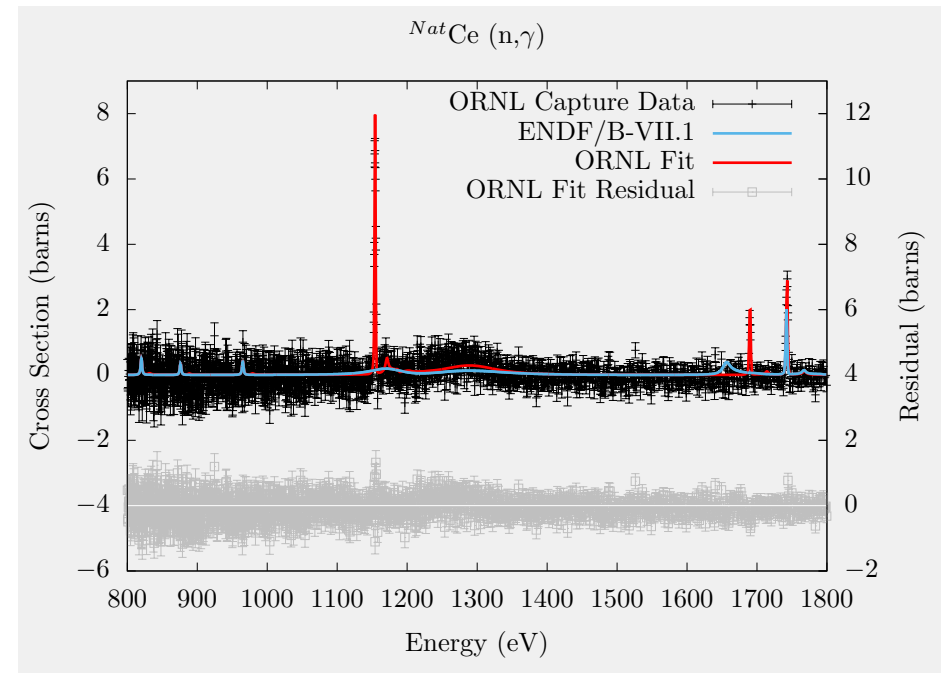
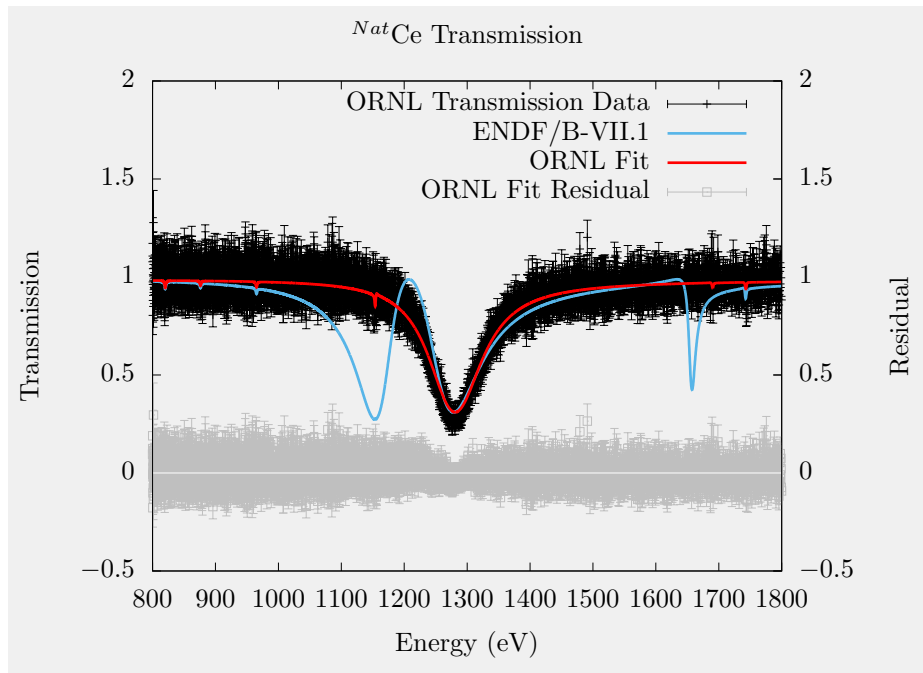
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We need to solve the engineering problem

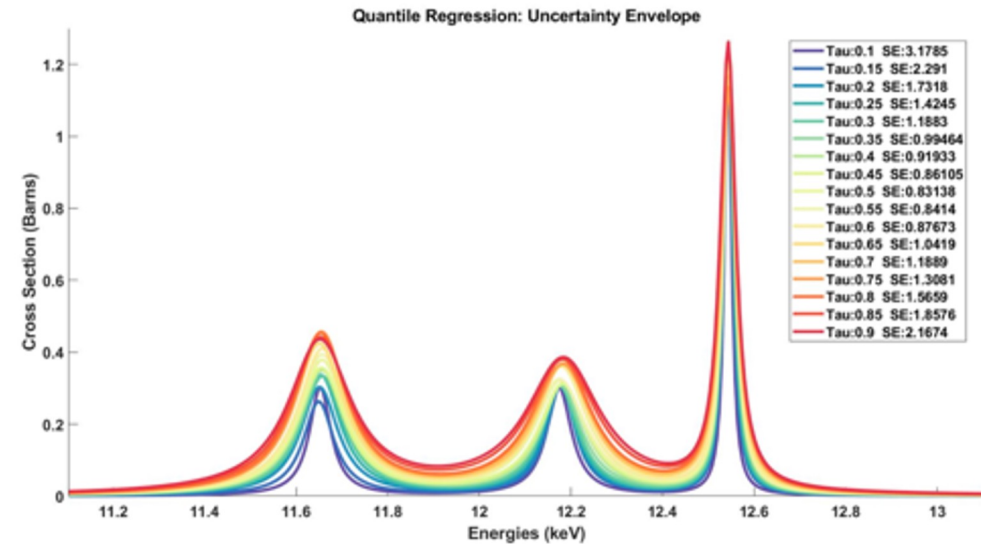
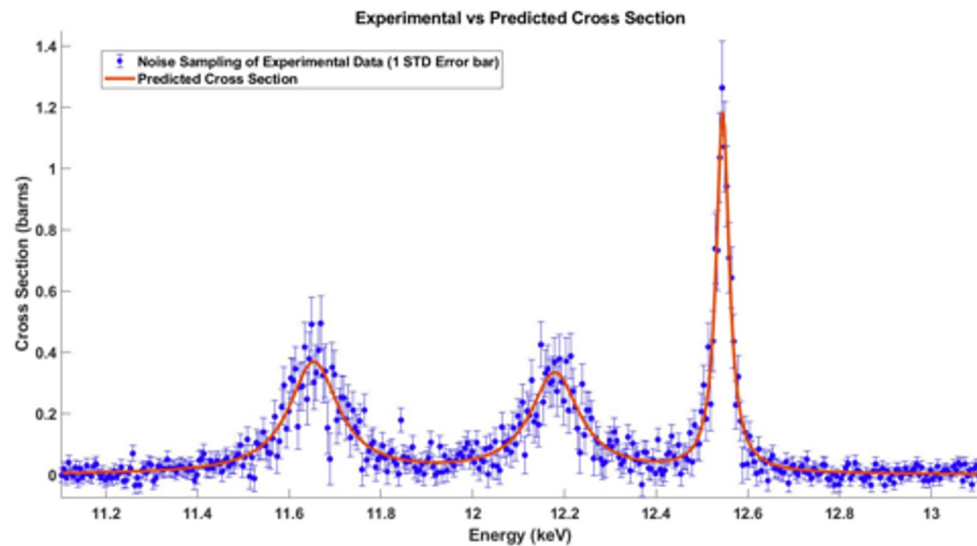
Motivation for automation



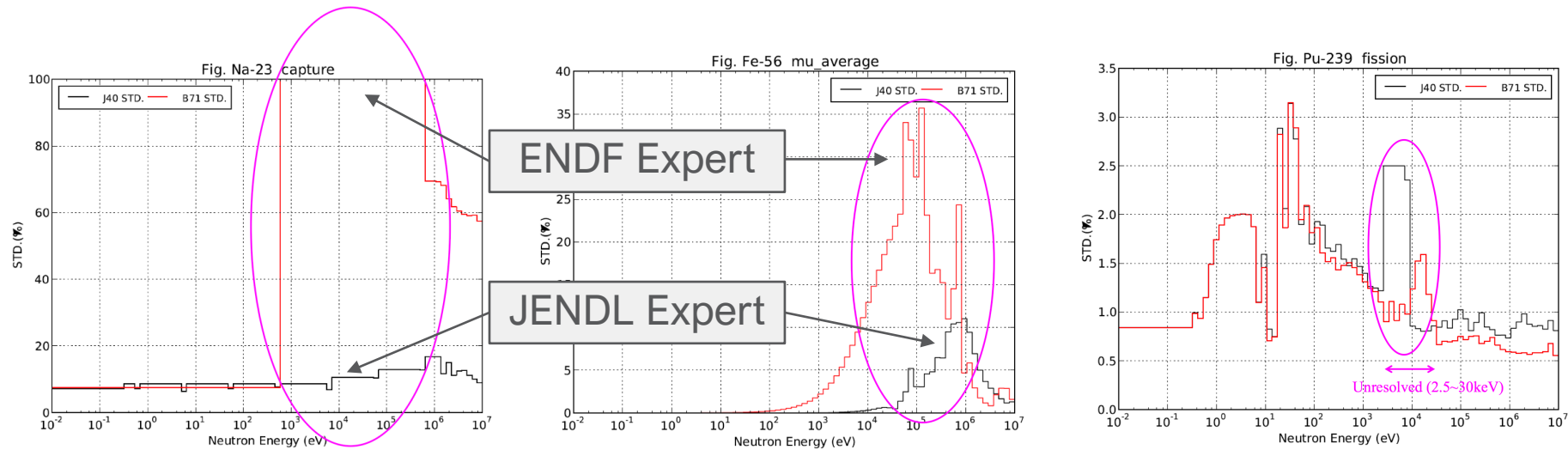
Motivation for automation



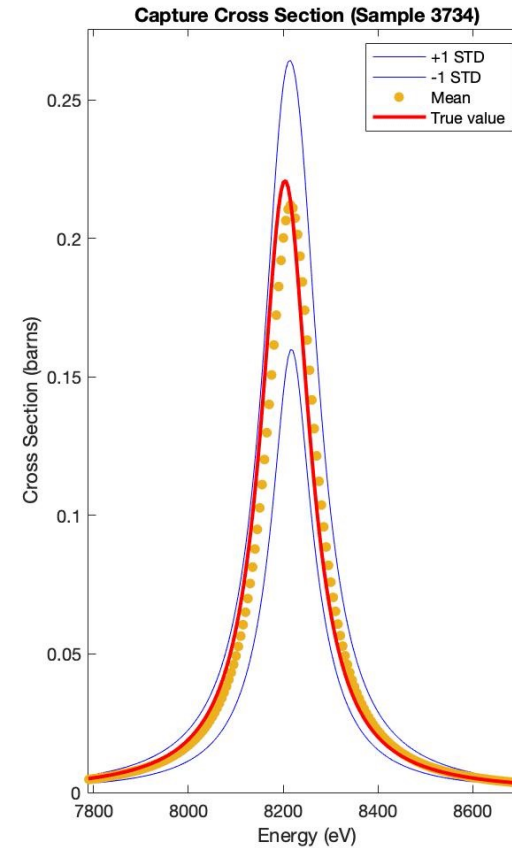
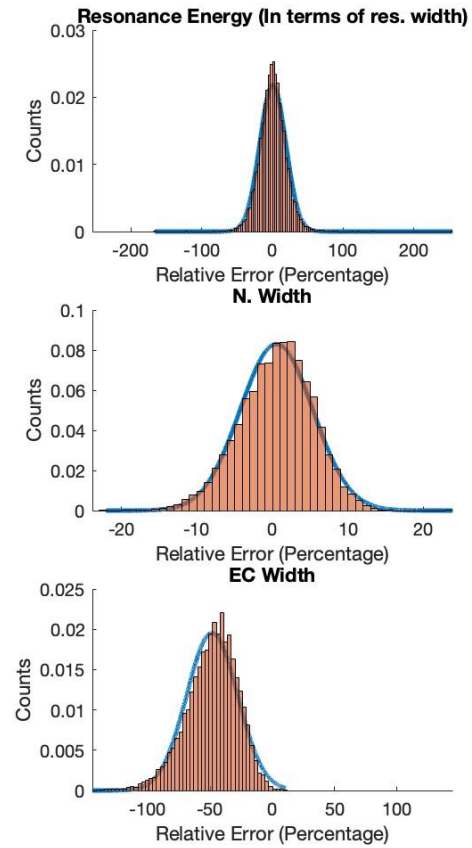
Motivation for automation



Motivation for automation



Learning the Function for Uncertainty Quantification



General Key take-aways

Applications of AI/ML to Nuclear Reaction Data Evaluation

Fast

- Rapid model “feature” detection is possible beyond human capabilities
- Systematic study of model defects

Reproducible

- An automated evaluation tool is “self-documenting” for the evaluation process
- Reproducibility allows for objective performance evaluation

Reliable

- Fast and reproducible enables verification of uncertainty quantification methods

Resonance Region

Key take-aways

Fast

- Automatic resonance detection
- Model defects: false and missing resonance identification

Reproducible

- Resonance detection in a reproducible and systematic manner
- Reproducible covariance evaluation

Reliable

- Demonstrated accuracy of covariance (confidence interval) estimation
- Uncertainty evaluation accounting for false and missing resonance