

Automated Resonance Fitting

Vladimir Sobes, Noah Walton, Amanda Lewis, Oleksii Zivenko, Jacob Forbes, Cole Fritsch, Aaron Clark

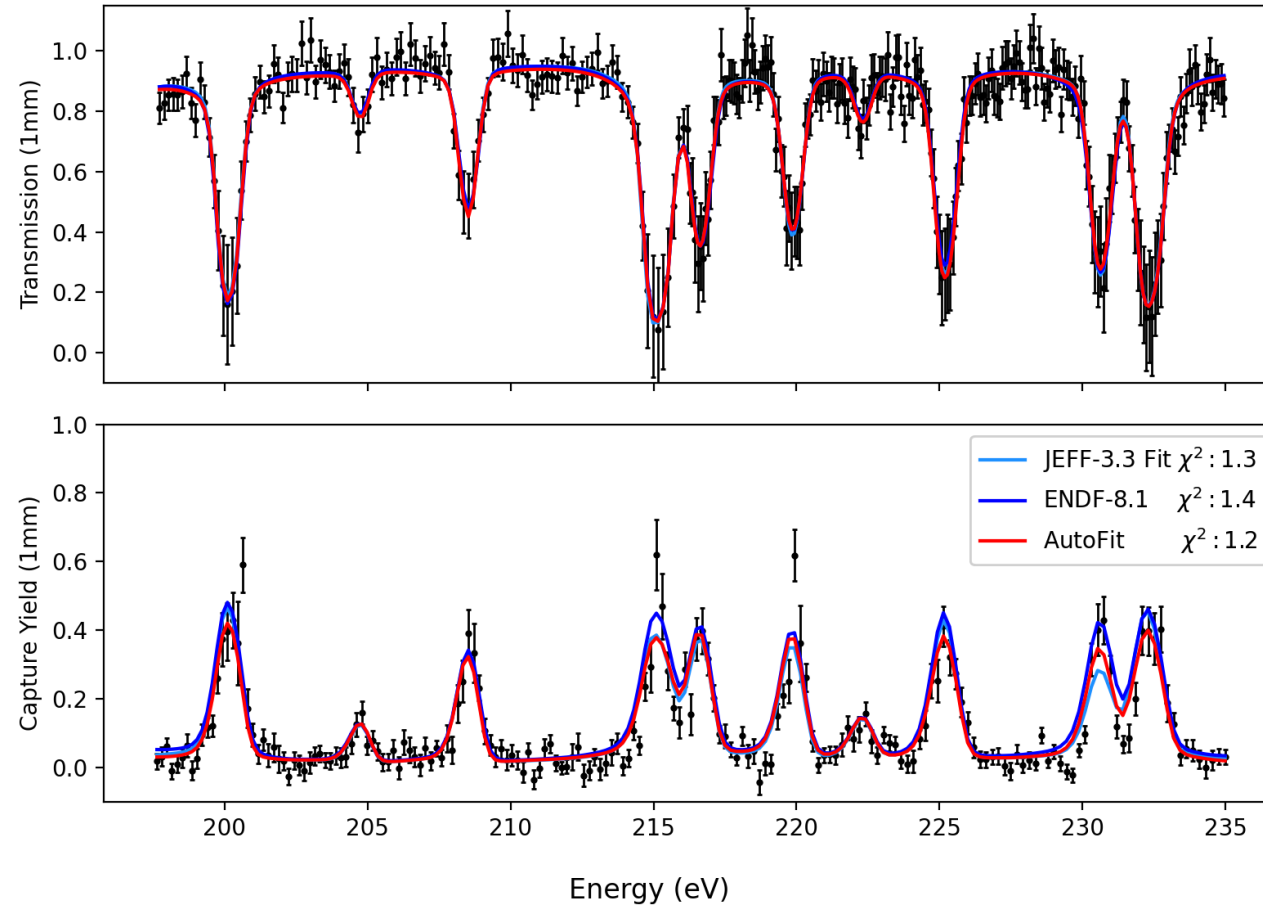


THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

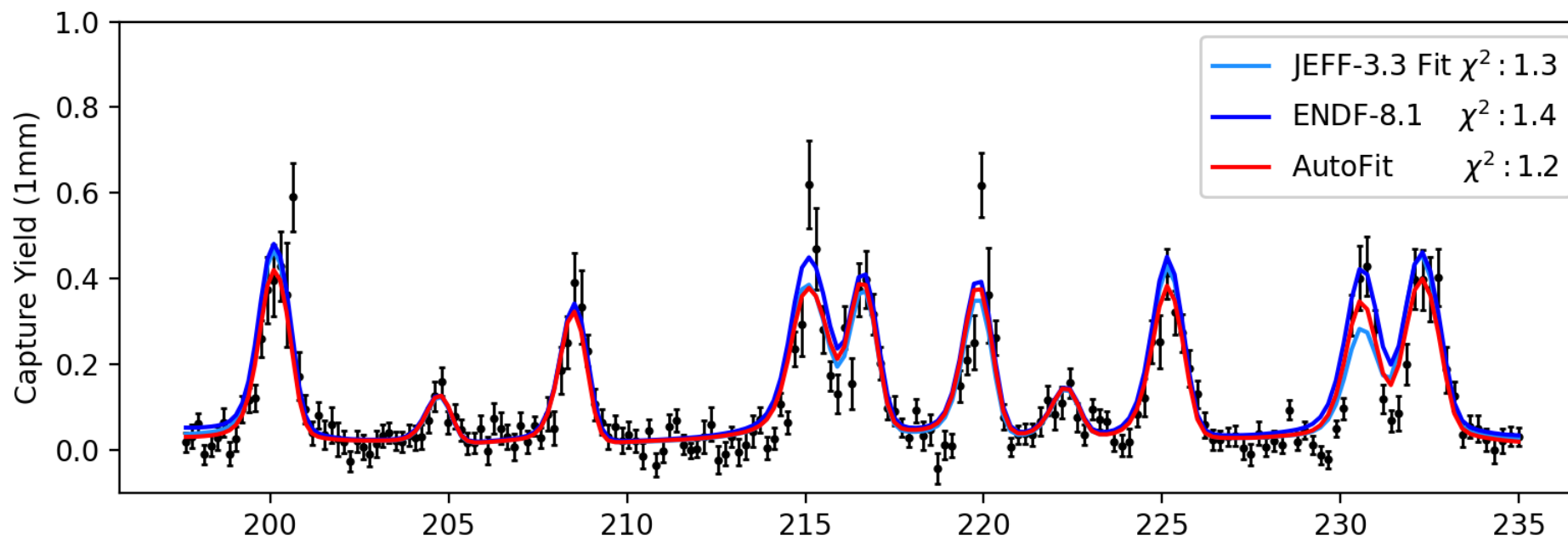
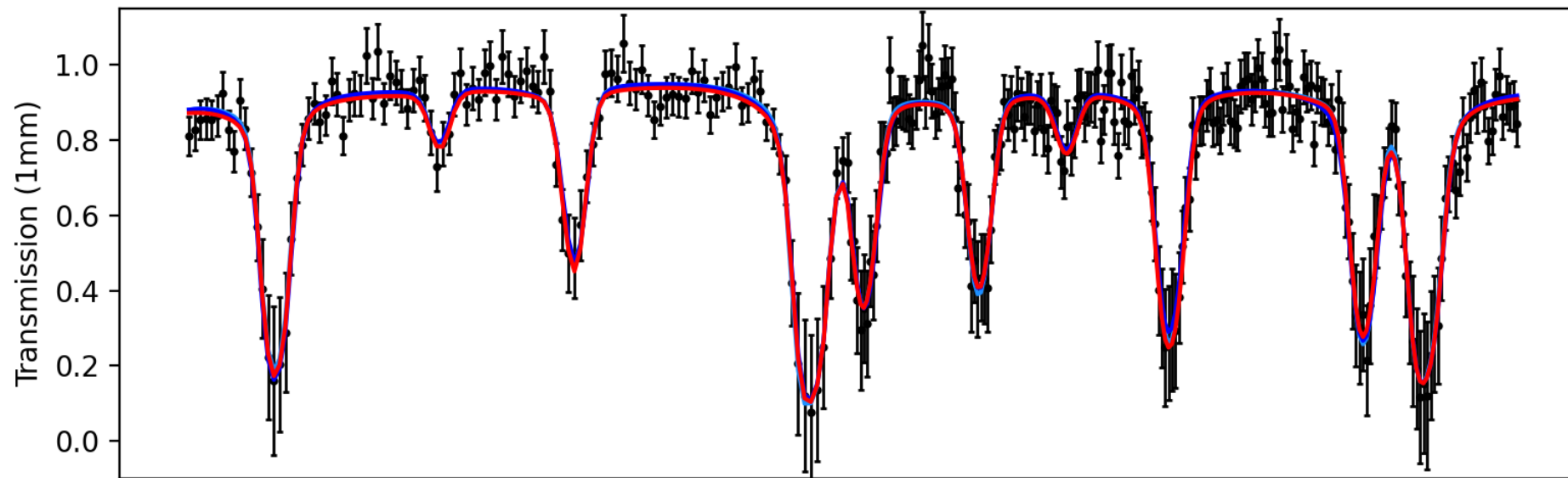
Fully Automated Resonance Fitting

Without synthetic data

Ta-181 Measurement Data and Fitted Models



Ta-181 Measurement Data and Fitted Models



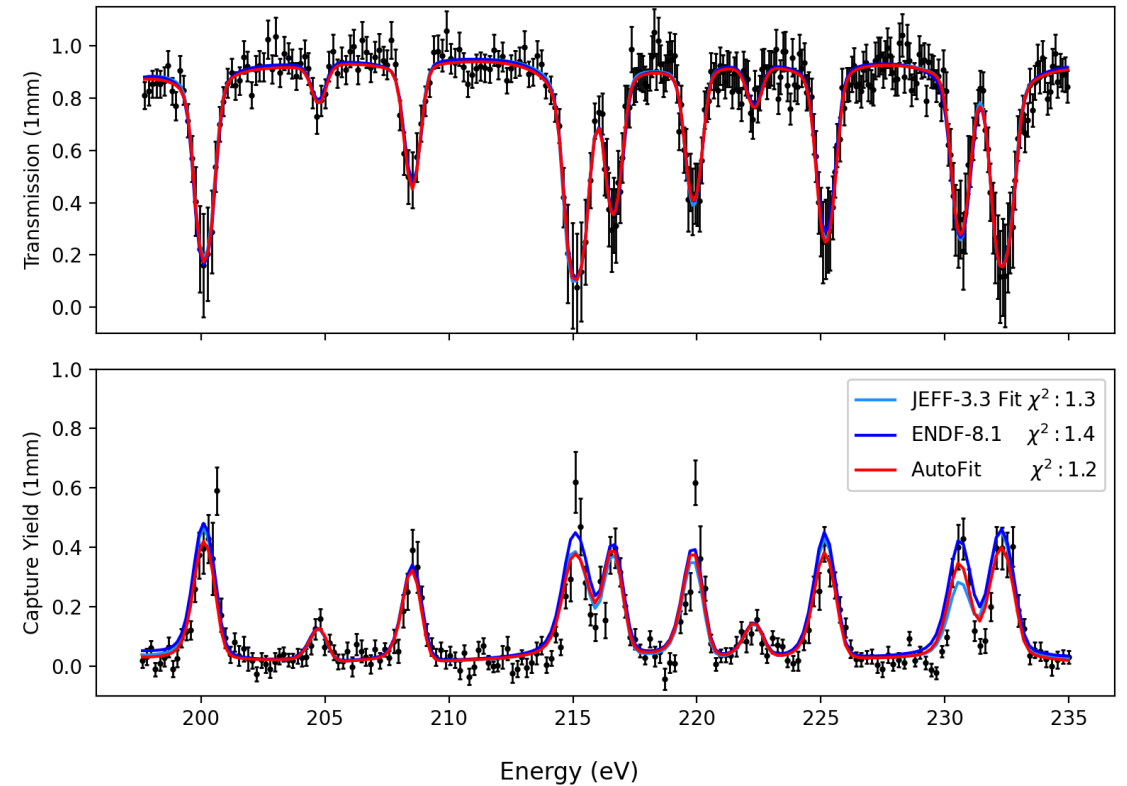
Energy (eV)

Fully Automated Resonance Fitting

Without synthetic data

- No synthetic data
- No resonance ladder priors
- No knowledge of average resonance parameter values
- Automatic “model selection”
 - number of resonances
- Spin groups from BRR (Nobre, Brown)

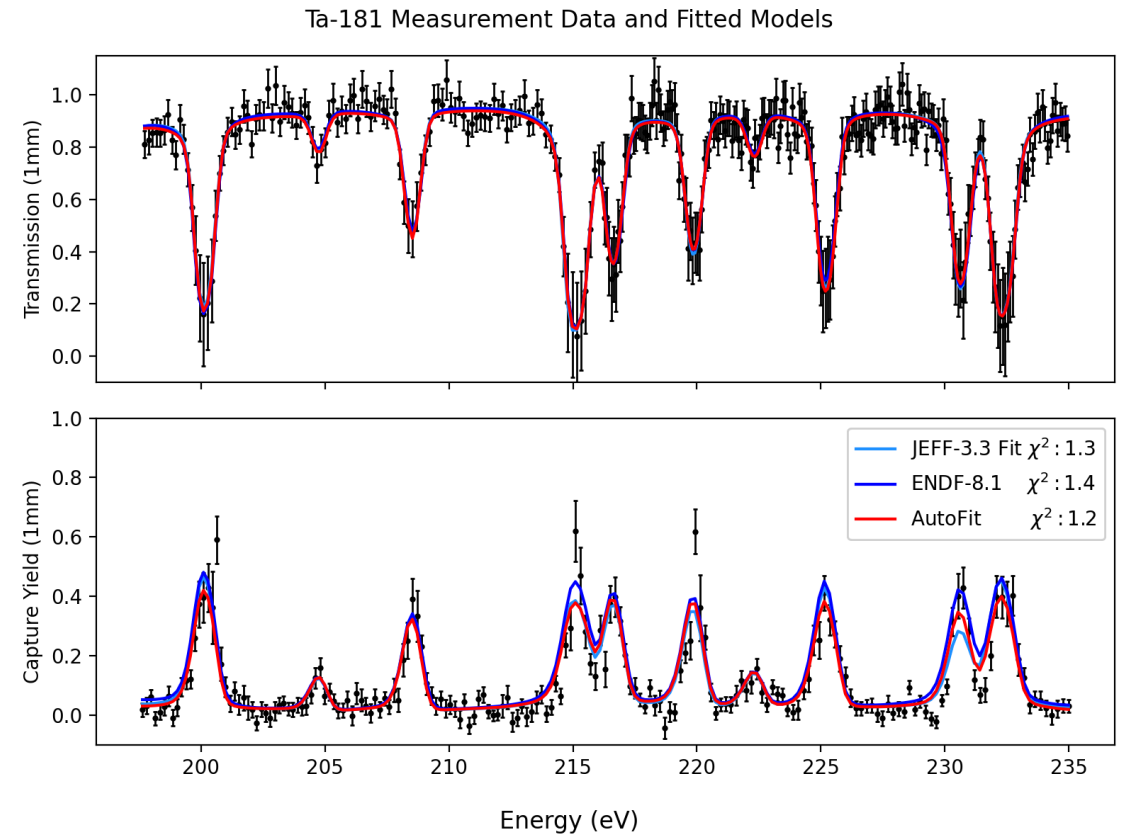
Ta-181 Measurement Data and Fitted Models



Fully Automated Resonance Fitting

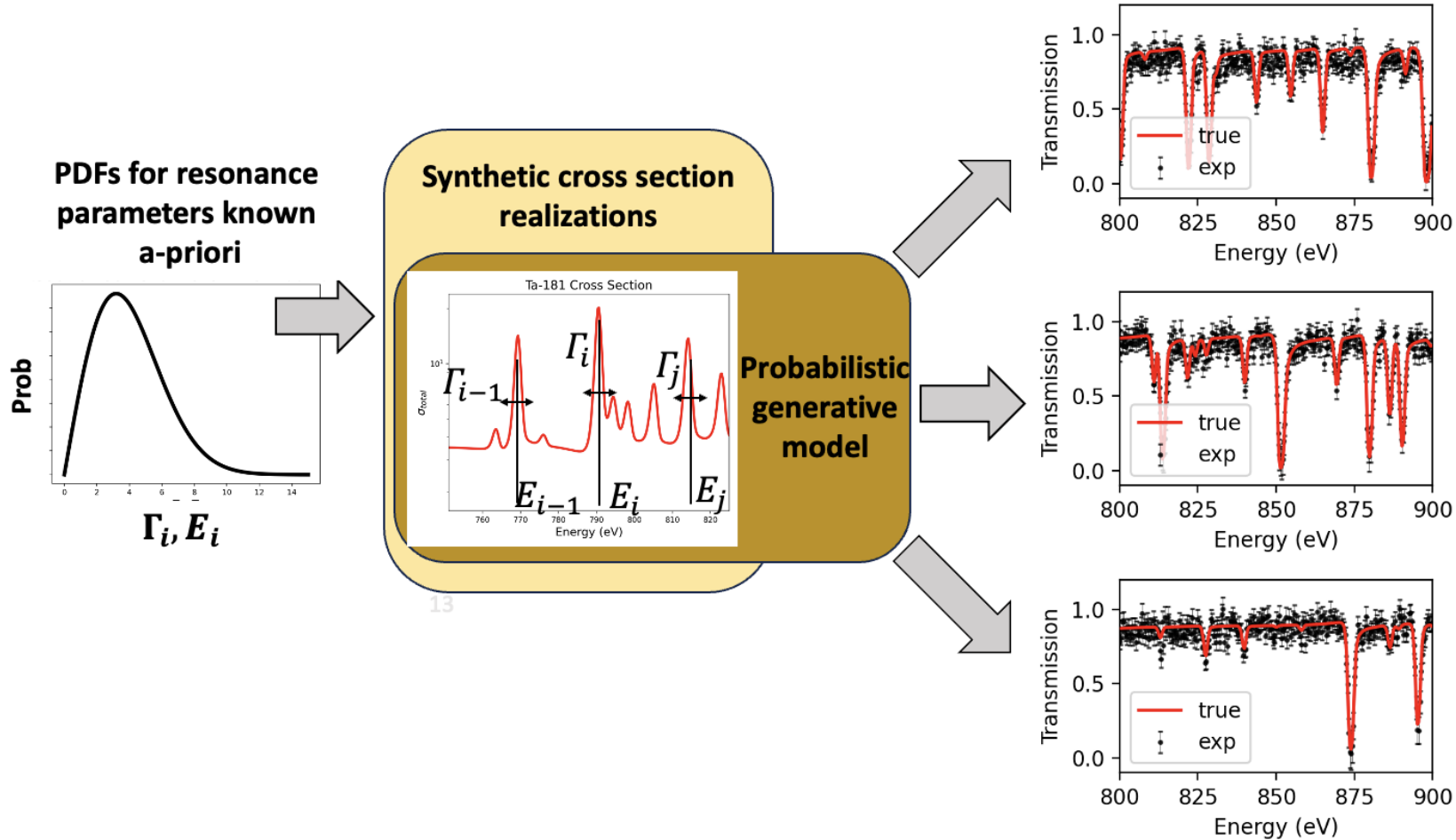
Current limitations

- Single energy window
 - Tested up to 10 resonances
 - Plan to extend to entire RRR before CSEWG
- Fission reaction not yet tested



Fitting Methodology Verification

The use case for synthetic data



13

Fitting Methodology Verification

The use case for synthetic data

- Enables automated fitting methodology verification
- Testing of hypothetical situations. E.g.:
 - Misreported data uncertainty
 - Missing resonances
 - Truncated spin groups
 - Reich-Moore approximation versus full R-Matrix
- Future differential experiment planning and optimization
- Verifiable uncertainty quantification!

