

# Format proposal: R-external function

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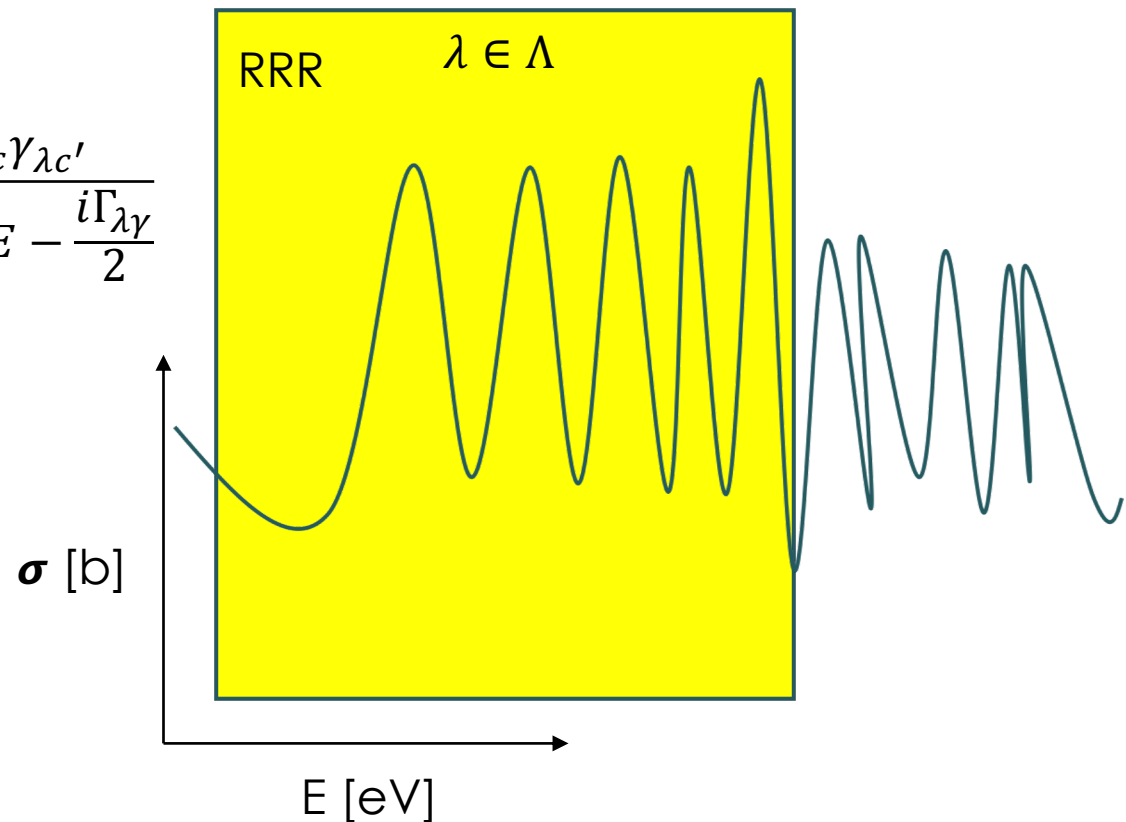


# R-external function

- Represents contributions from “external” levels

$$R_{cc'} = \sum_{\lambda} \frac{\gamma_{\lambda c} \gamma_{\lambda c'}}{E_{\lambda} - E - \frac{i\Gamma_{\lambda\gamma}}{2}}$$

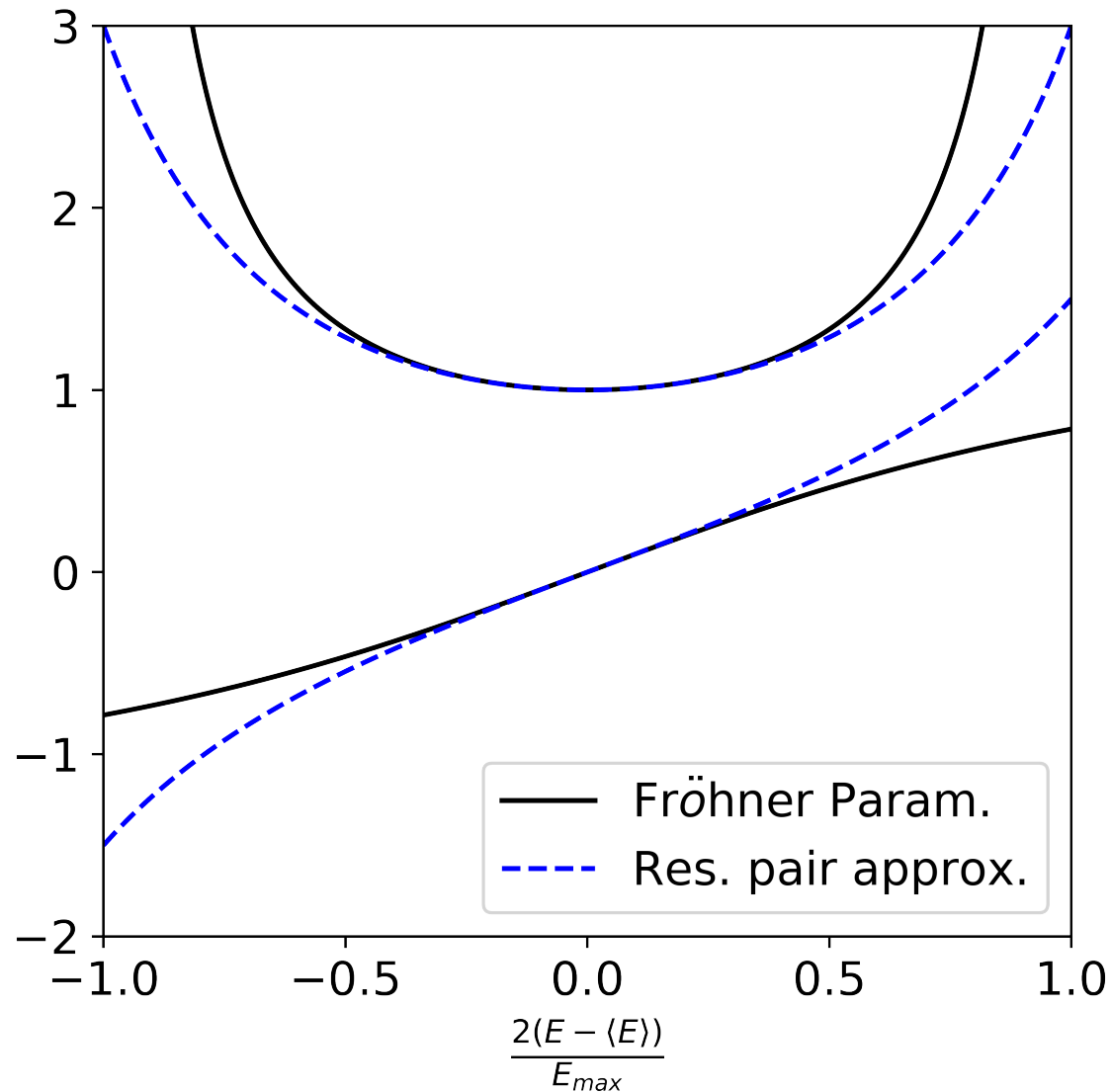
$$R_{cc'}^0 = \left( \sum_{\lambda} - \sum_{\lambda=1}^{\Lambda} \right) \frac{\gamma_{\lambda c} \gamma_{\lambda c'}}{E_{\lambda} - E - \frac{i\Gamma_{\lambda\gamma}}{2}}$$



# Format proposal

- File 2, LRF=7
- Complete the description in the format manual
  - Current description is incomplete (Section 2.2.1.6)
  - Initiated with formalism from Frohner and Larson
- Provide evaluators with concise, clear formalism
- KBK flag indicates additional LIST rec. in current format
- What's new:
  - Specify the length of the list

# Current methods vs. R-external function



# Implementation

```
...  
-----  
ERNRS, GAM1,NRS, GAM2,NRS, GAM3,NRS, GAM4,NRS, GAM5,NRS,  
GAM6,NRS, ----- GAMNCH,NRS ]LIST
```

Resonance  
List

Now the SAMMY parameterization for **LBK=2**.

```
[MAT, 2, 151/ 0, 0, 0, LBK, 12*NCH, 2*NCH/  
ED1, EU1, R01, R11, R21, S01,  
S11, 0.0, 0.0, 0.0, 0.0, 0.0,  
ED2, EU2, R02, R12, R22, S02,  
S12, 0.0, 0.0, 0.0, 0.0, 0.0,  
EDNCH, EUNCH, R0NCH, R1NCH, R2NCH, S0NCH,  
S1NCH, 0.0, 0.0, 0.0, 0.0, 0.0, ]LIST
```

R-external  
List  
(Defined for every  
spin group)

# Final Thoughts

- Better formalism
  - Concise level-statistical description<sup>1</sup>
  - Clear rationale for starting values<sup>1</sup>
  - Explicit connection to the URR
- Will not affect existing codes (KBK flag = 0)
  - Checker codes
  - Should already expect LIST record if KBK > 0
  - AMPX can read and write files with this specification
  - SAMRML (AMPX, reconstruction) calculation matches SAMMY (evaluation)

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[1] F. Frohner, O. Bouland, *Treatment of External Levels in Neutron Resonance Fitting: Application to the Nonfissile Nuclide <sup>52</sup>Cr*. Nuclear Science and Engineering: 137, 70-88 (2001)