^{238}U(p,X) Yield Estimates

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Calculation of Yields

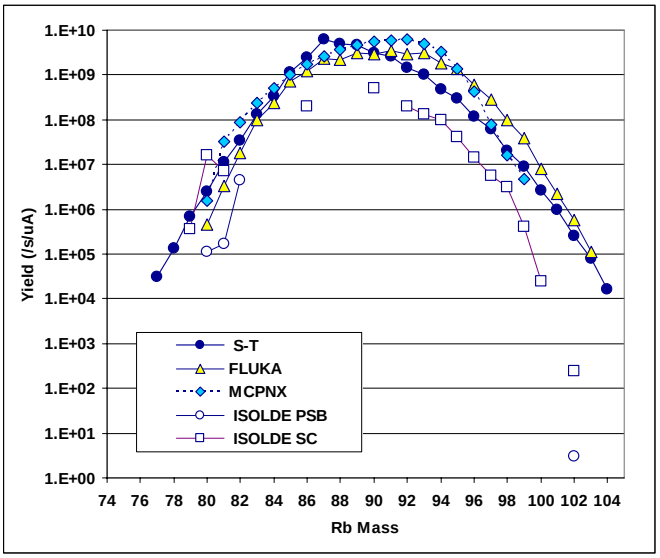
- Silberberg-Tsao semi-empirical formulae (Marik Dombsky)
- FLUKA Monte Carlo INC (Colin Morton)
- MCPNX-CINDER Monte Carlo INC (Danas Ridikas, Saclay)
- Compared to experimental ISOLDE yields (where available)
- Assume 25 g U/cm^2 target thickness

In-target production only
No account of delay losses during release

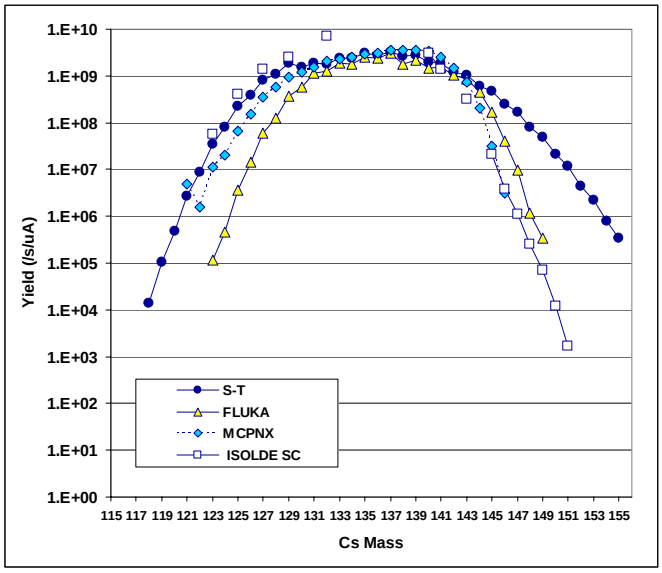
Comparison of Codes & Experiment

- No clear winner among the 3 codes:
  - Good agreement in mass regions where data is available
  - Disagreement in mass regions with little experimental data
  - Often differences of several orders of magnitude
  - Because the experimental ISOLDE yields include half-life effects, they do not necessarily help in differentiating model veracity
  - Different models may be accurate in different mass regions

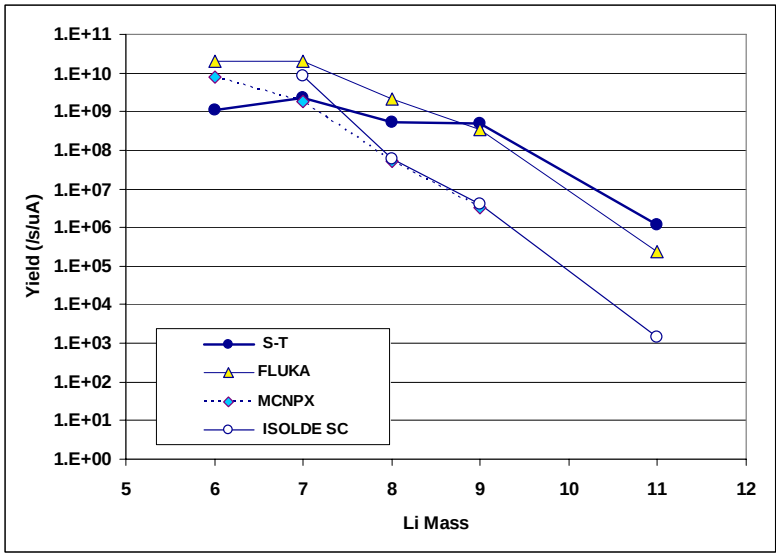
The "classical" fission regions



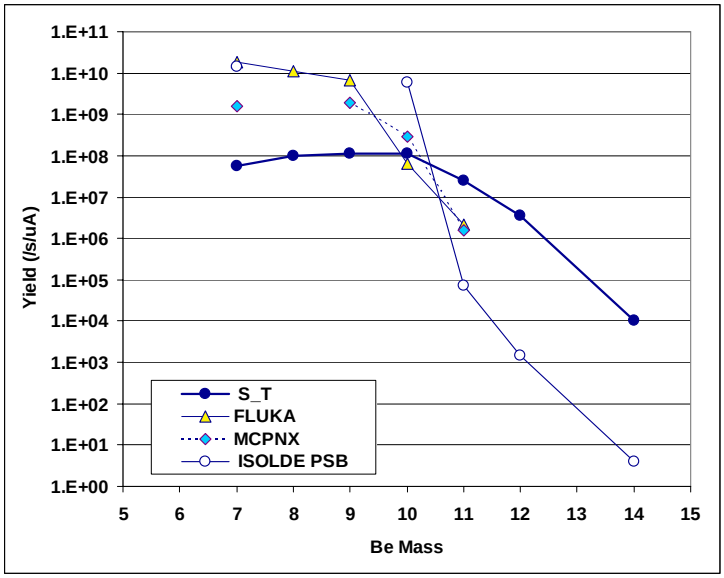
The “classical” fission regions



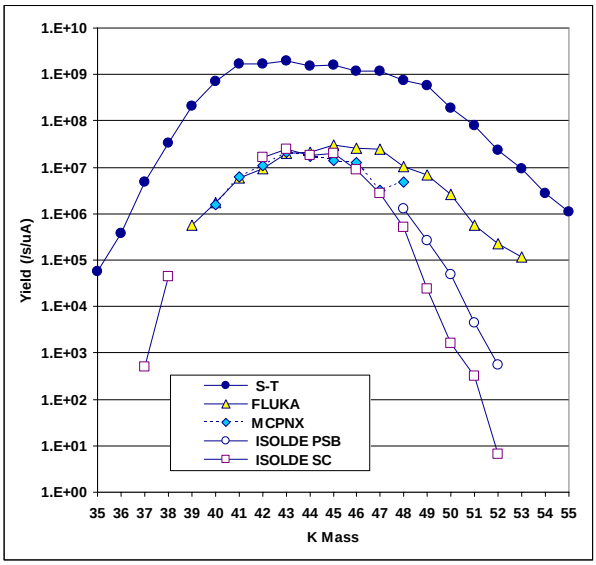
The light mass region



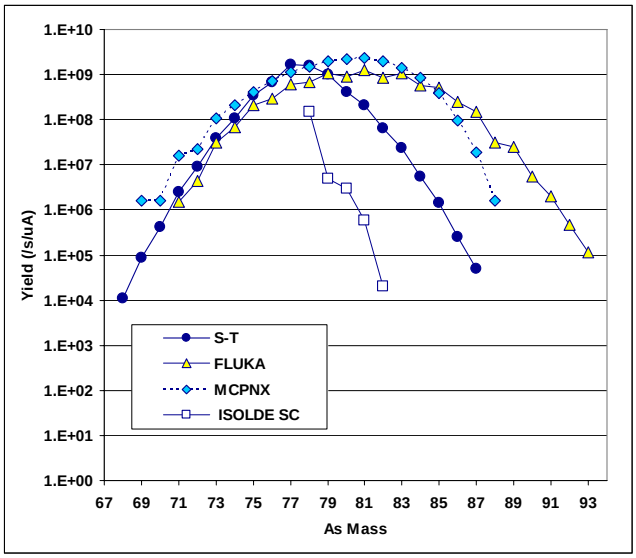
The light mass region



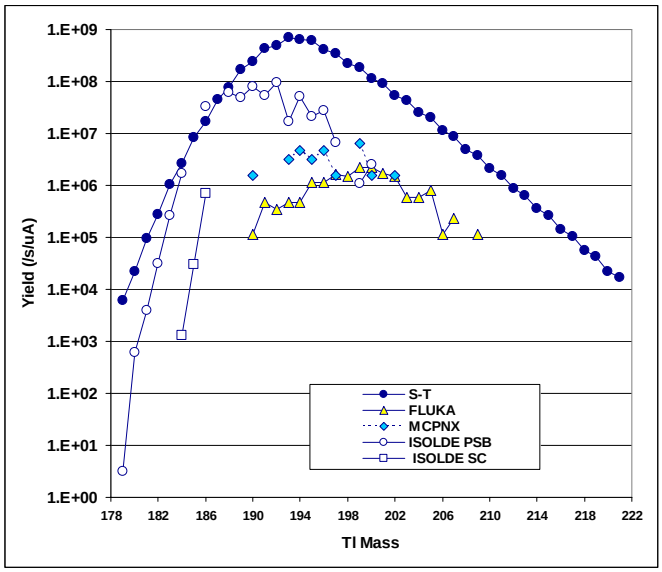
The intermediate mass regions



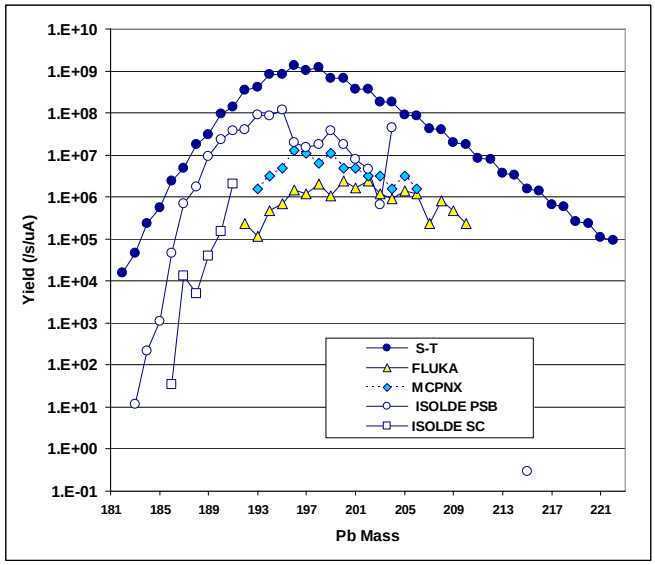
The intermediate mass regions



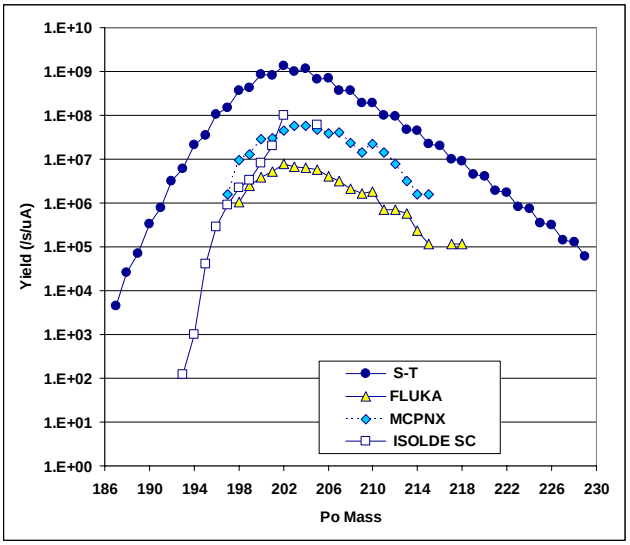
The heavy mass region



The heavy mass region



The near spallation mass region



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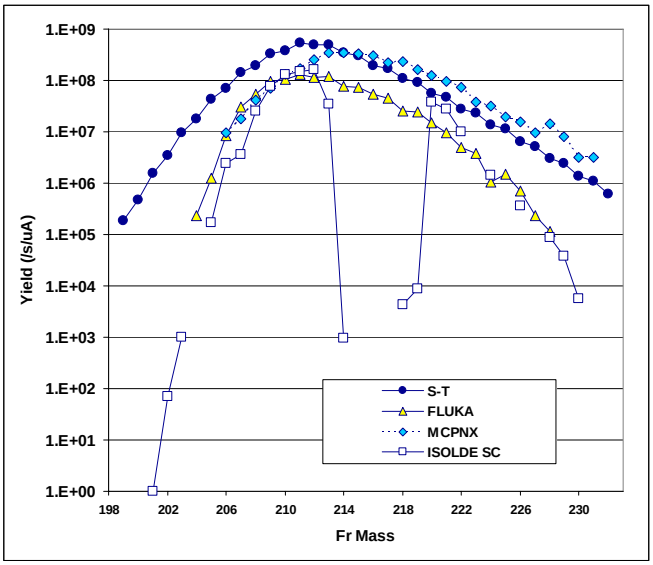

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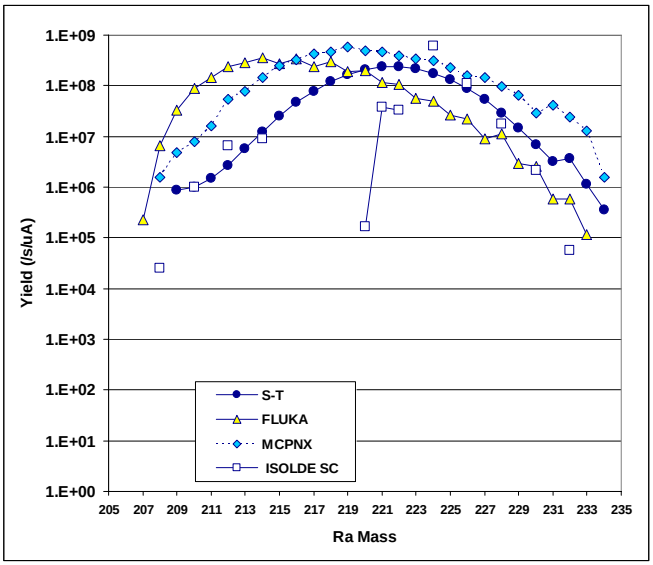
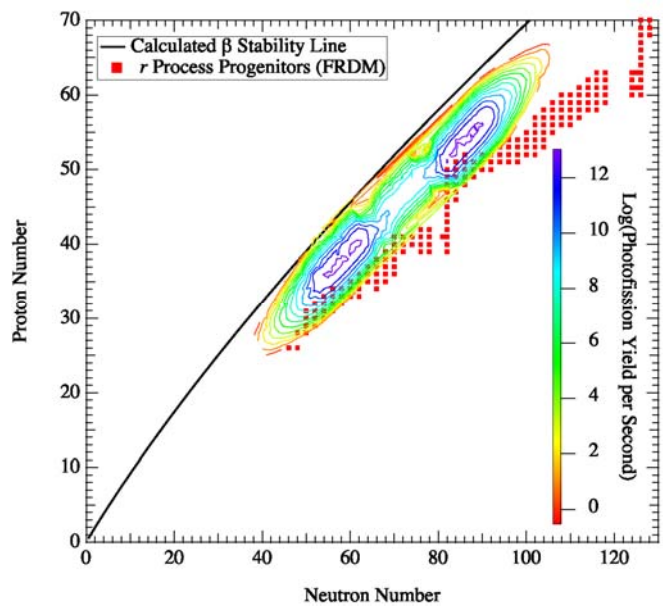


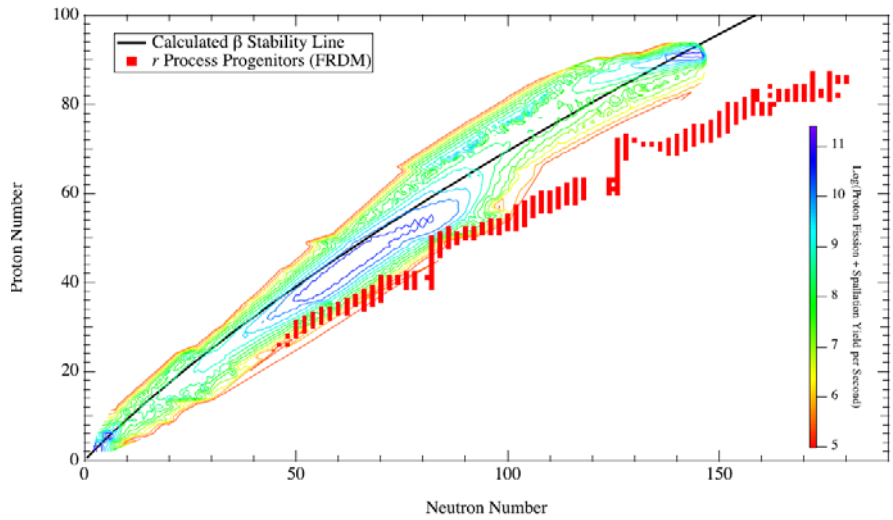
The Averaged Yields

- Geometric mean of all 3 calculation results for 10 μA p^+
- Plotted as Z vs N intensity plots
  (courtesy of Greg Hackman & Barry Davids)
- Compared to $^{238}U(\gamma,f)$ yields calculated by Pierre Bricault

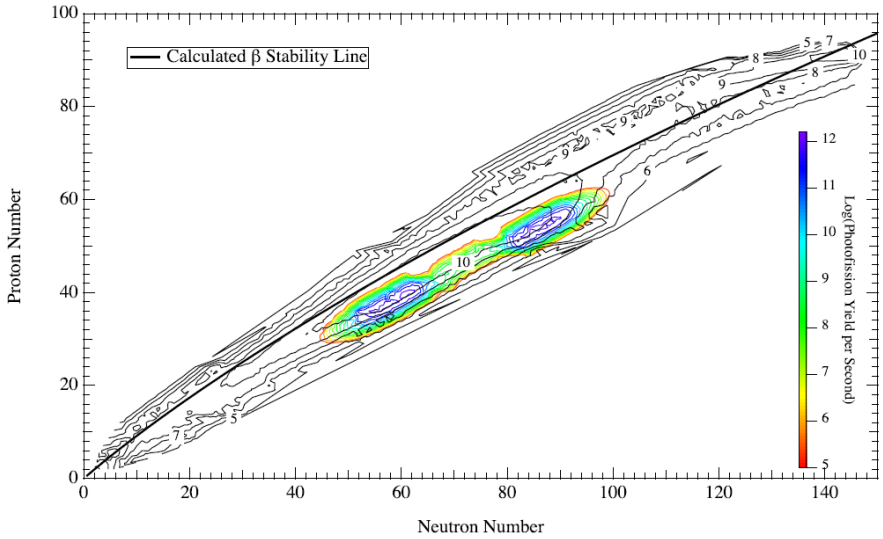
$^{238}U(\gamma,f)$ Yields



^{238}U(p,X) Yields



Independent Photofission & (p^+,X) Yield Ratios



Element Comparison