

Electrodisintegration of the Deuteron Close to Threshold and Big-Bang Nucleosynthesis*



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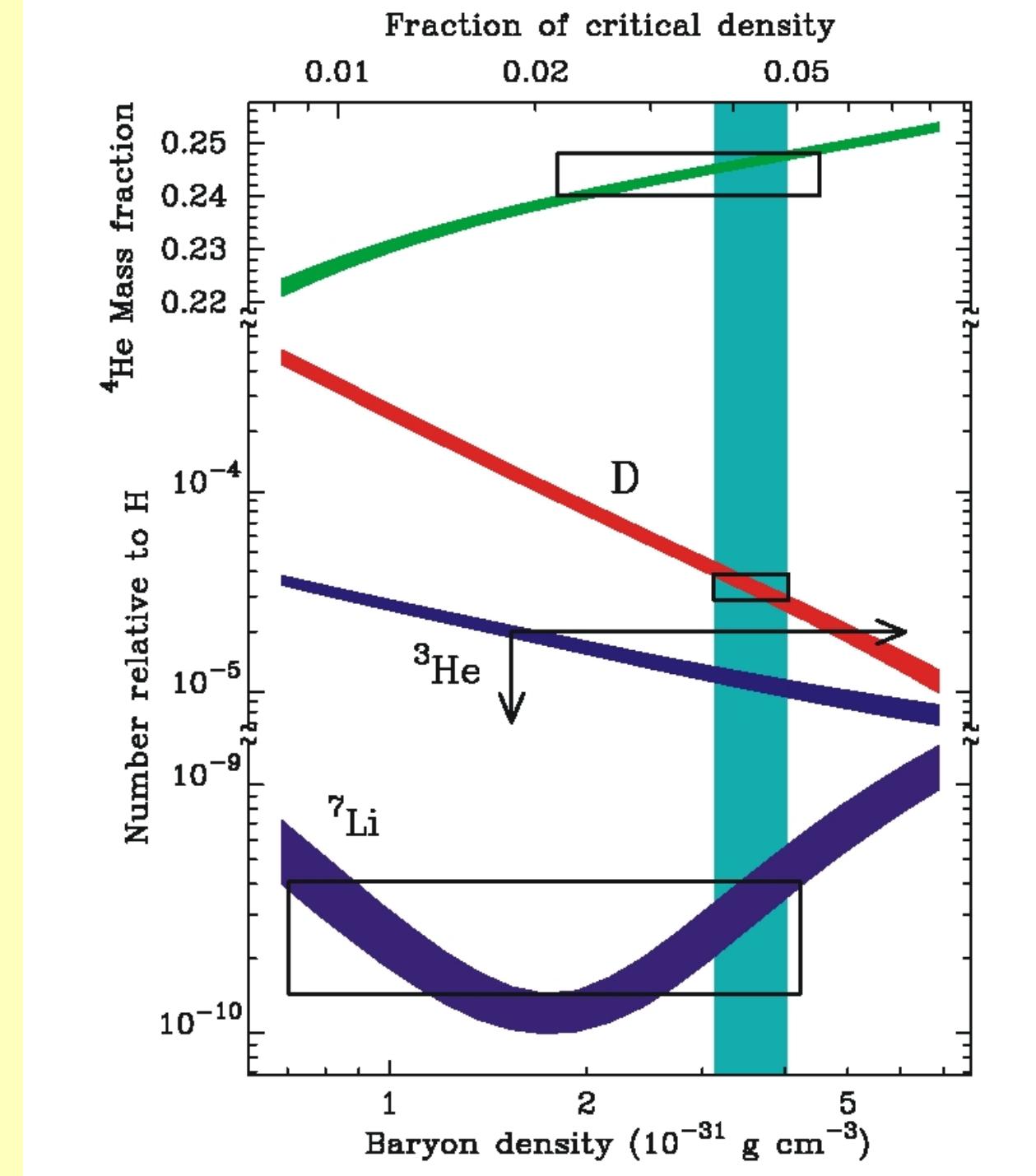
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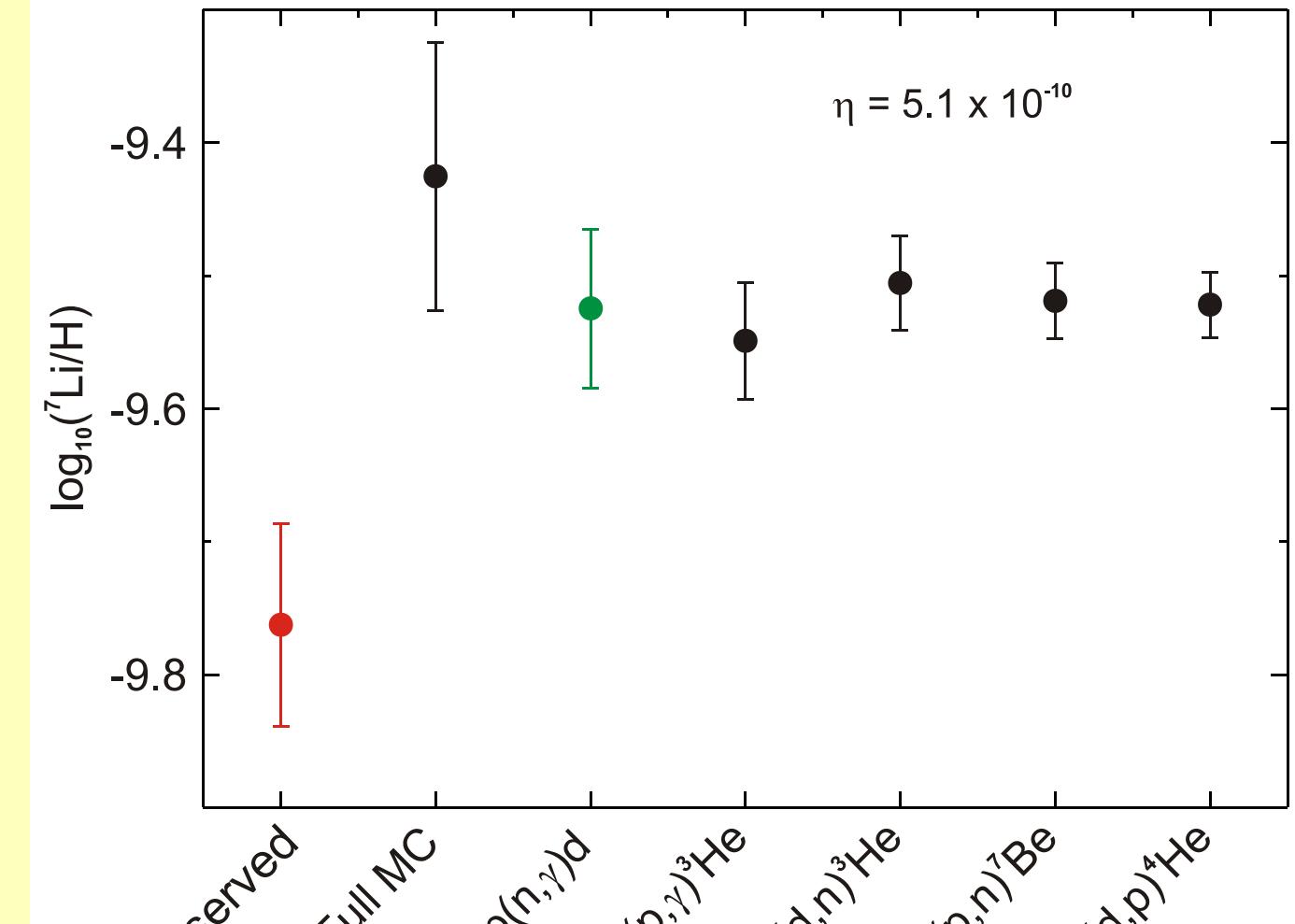
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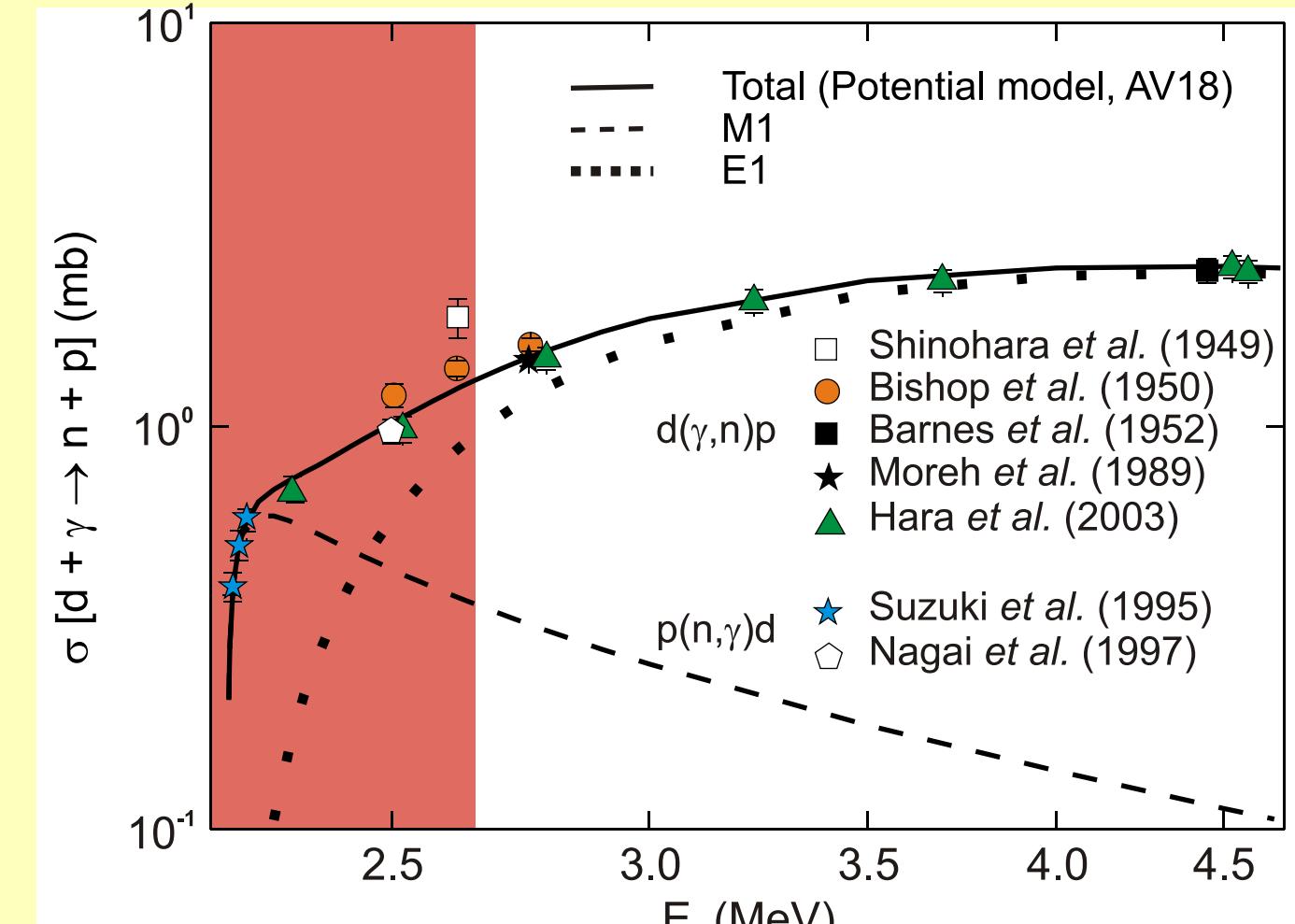
Motivation



- D, ^3He , ^4He , ^7Li are synthesized
- Abundances depend on baryon/photon ratio (barion density)
- Observational constrains
- Relevant energy window 15 – 300 keV
- M1 dominates $\Rightarrow d(e,e')$ at 180°

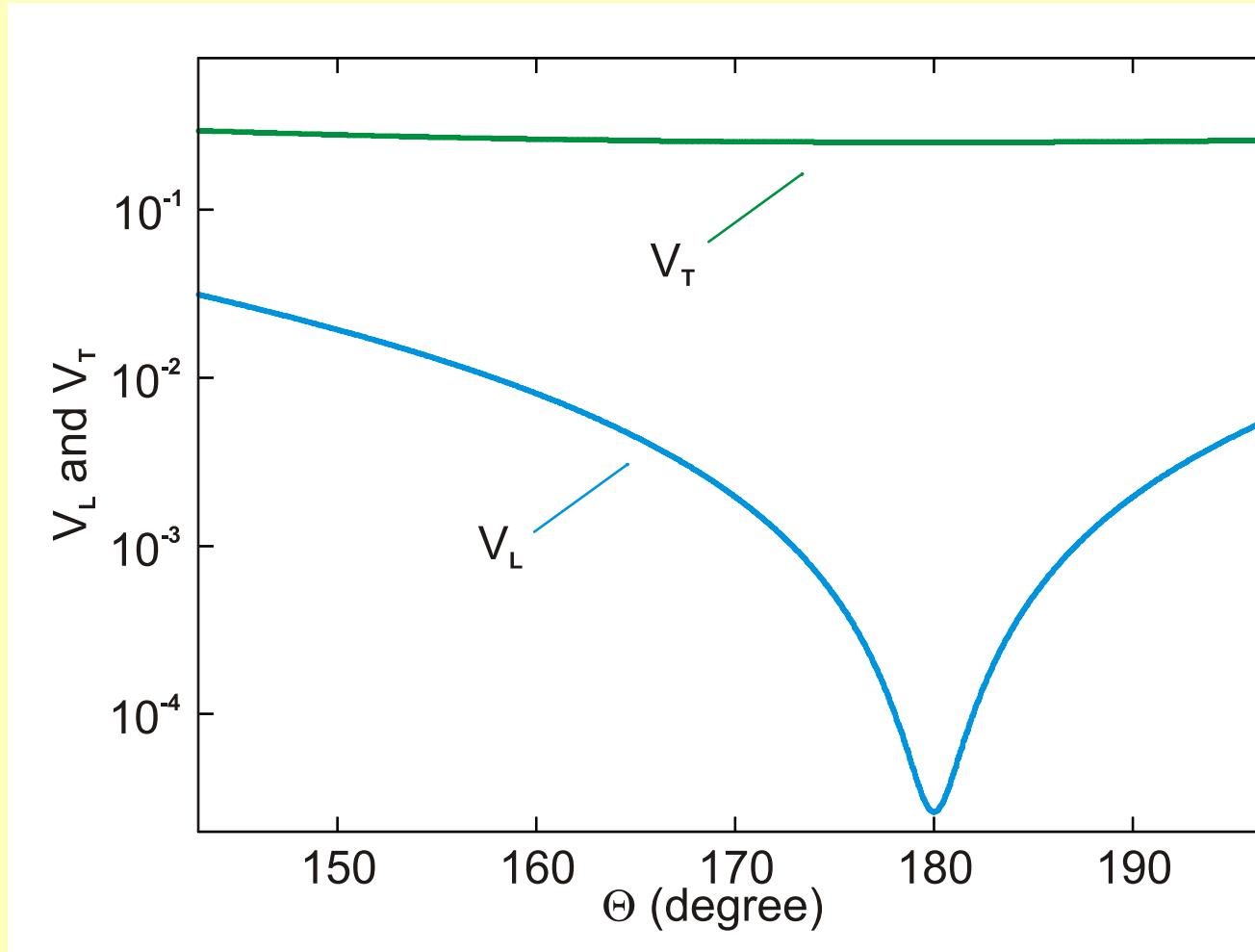
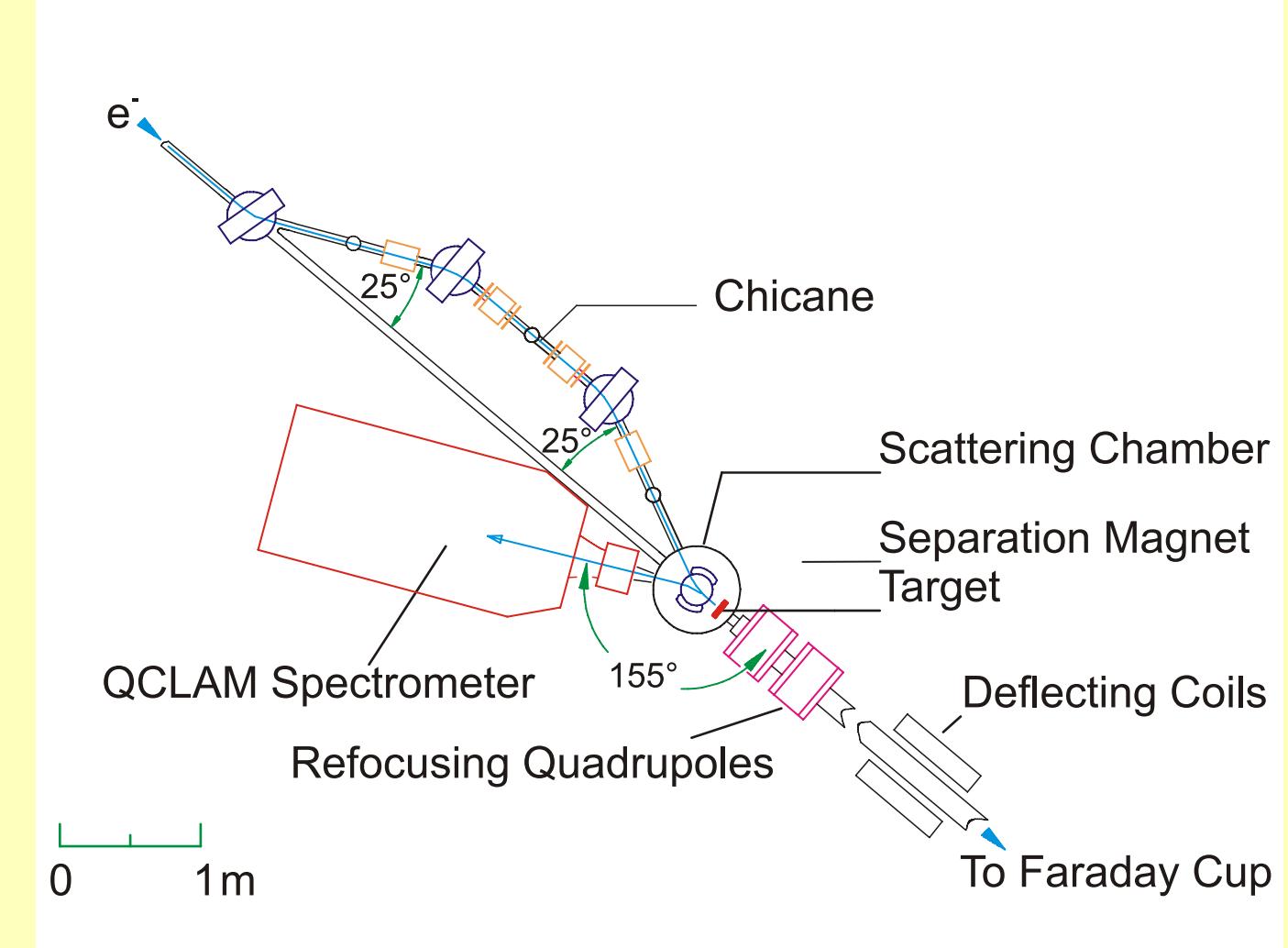
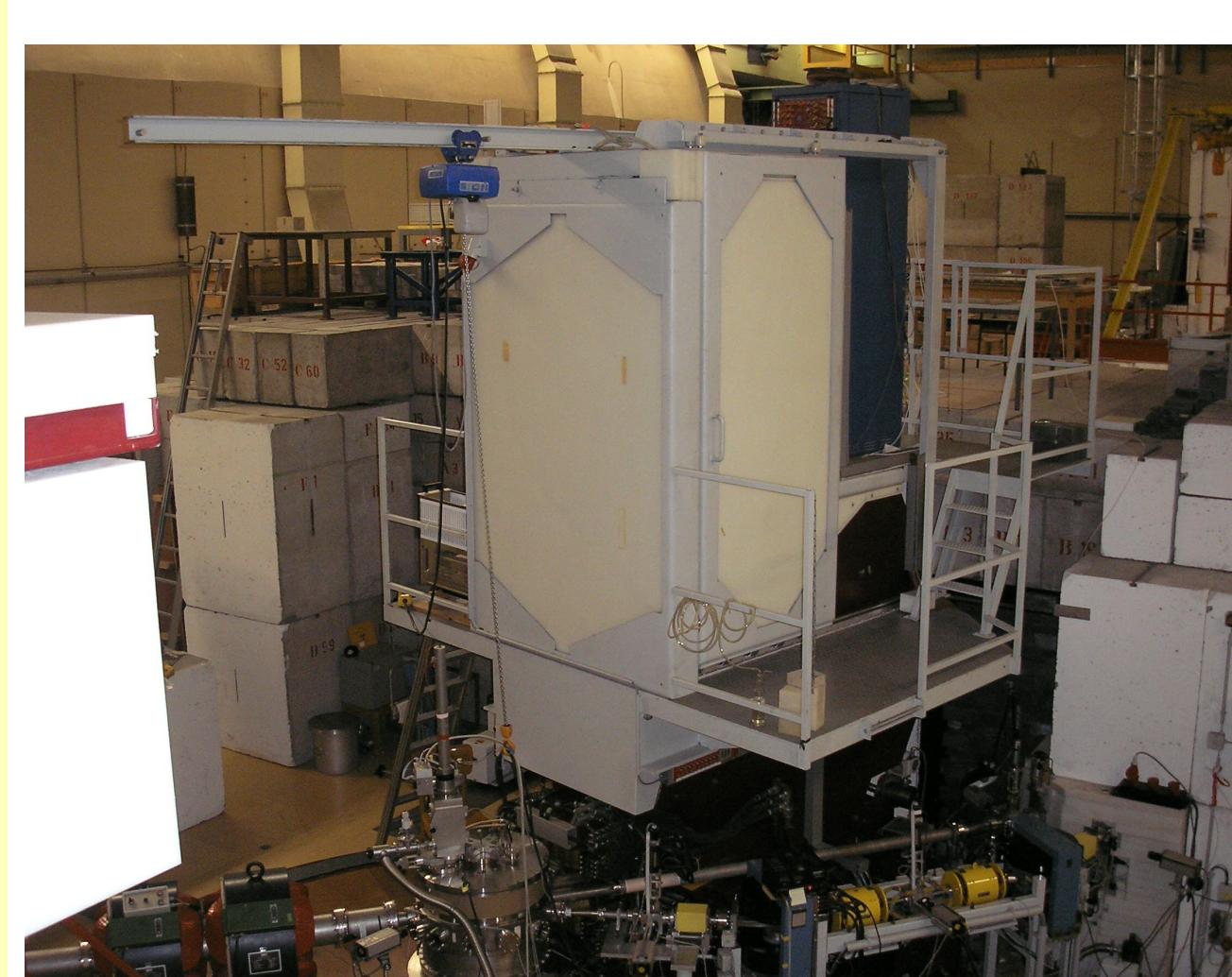


- Largest uncertainty from $p(n,\gamma)d$ reaction



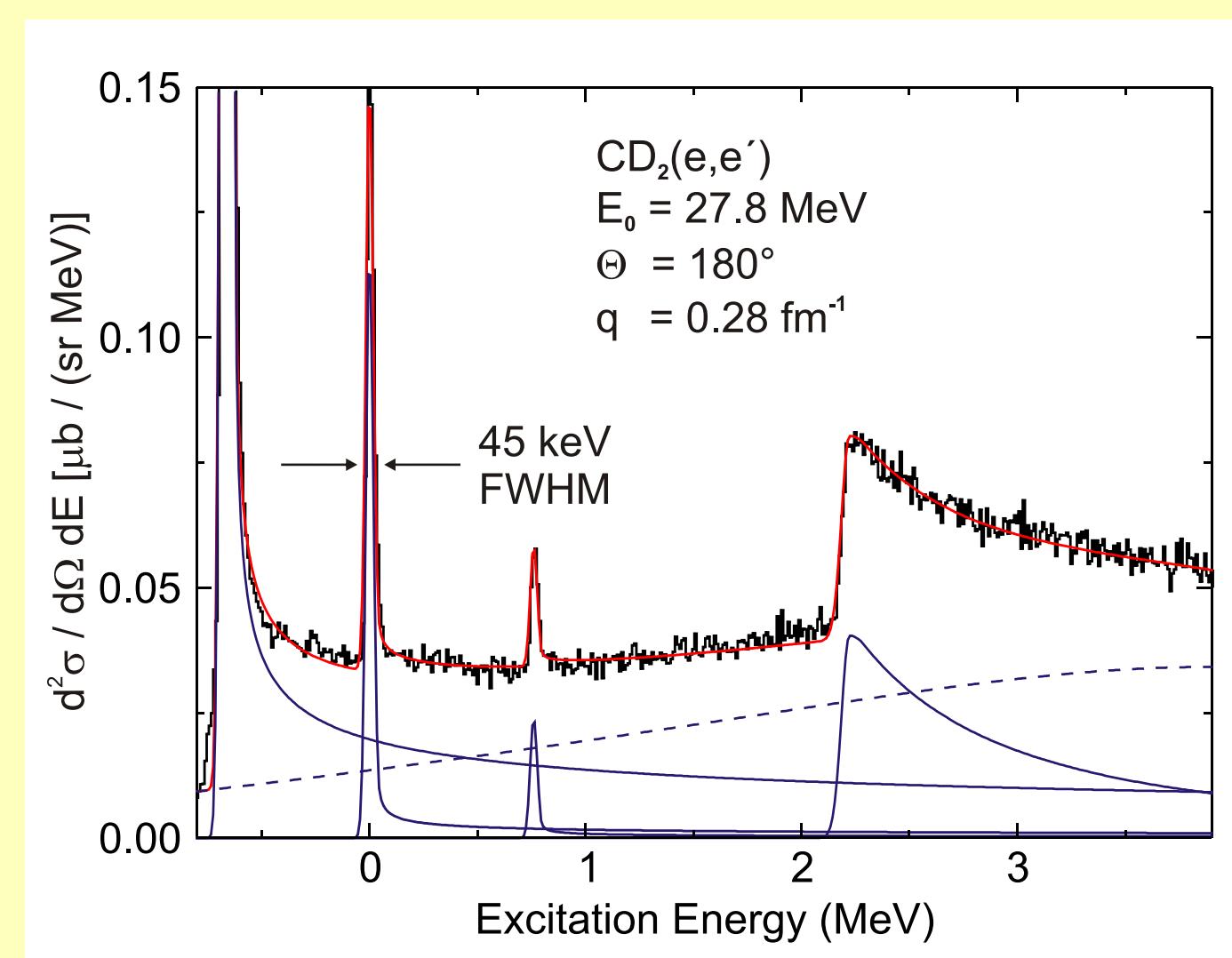
- Momentum acceptance $\Delta p/p = \pm 10\%$
- Angular acceptance $\Delta\Omega = 9.6 \text{ msr}$
- Momentum transfer $q = 0.2 - 0.85 \text{ fm}^{-1}$
- Scattering at 180° is ideal for measuring transverse excitations $\Rightarrow M1$ enhanced

180° Electron Scattering at the S-DALINAC

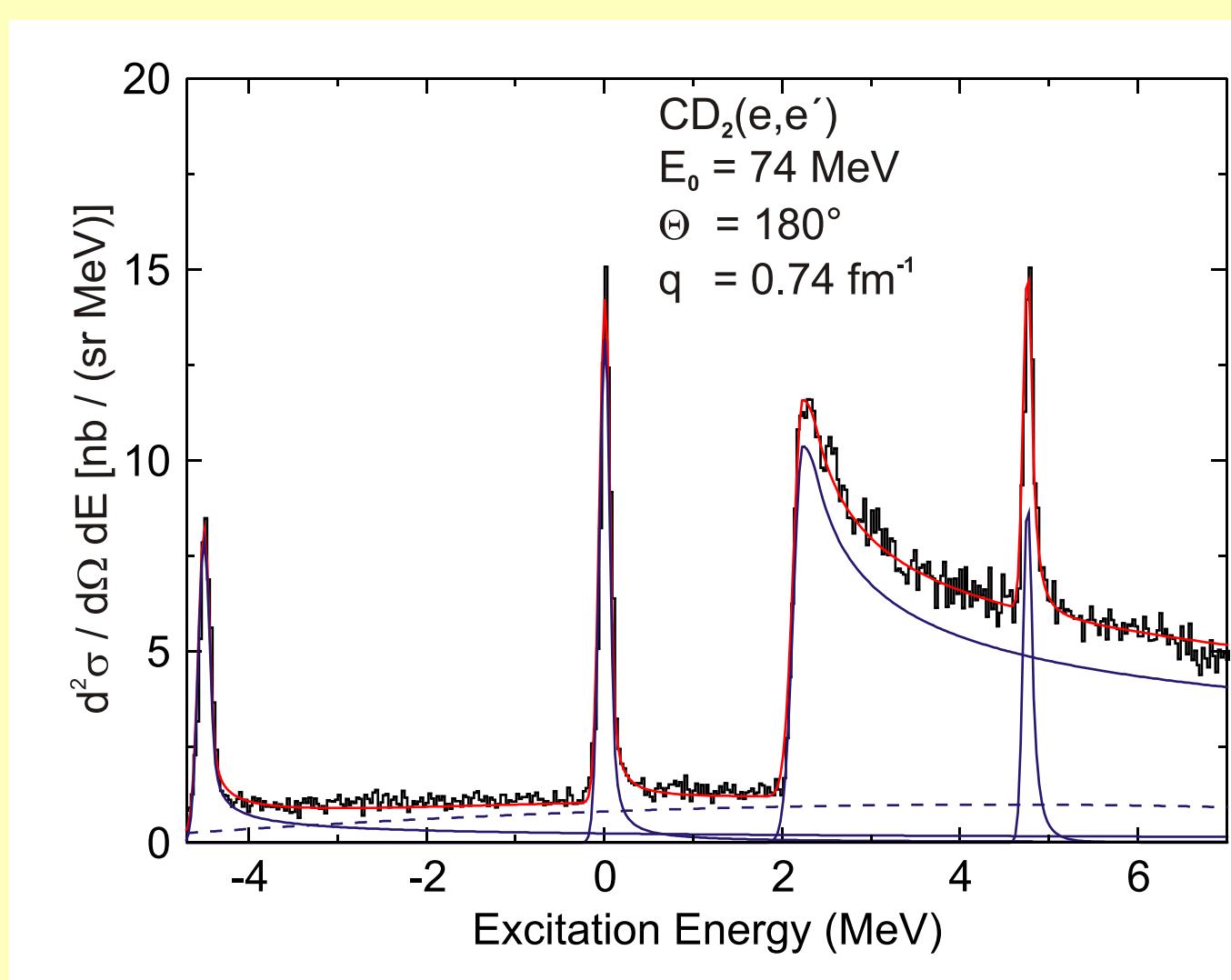


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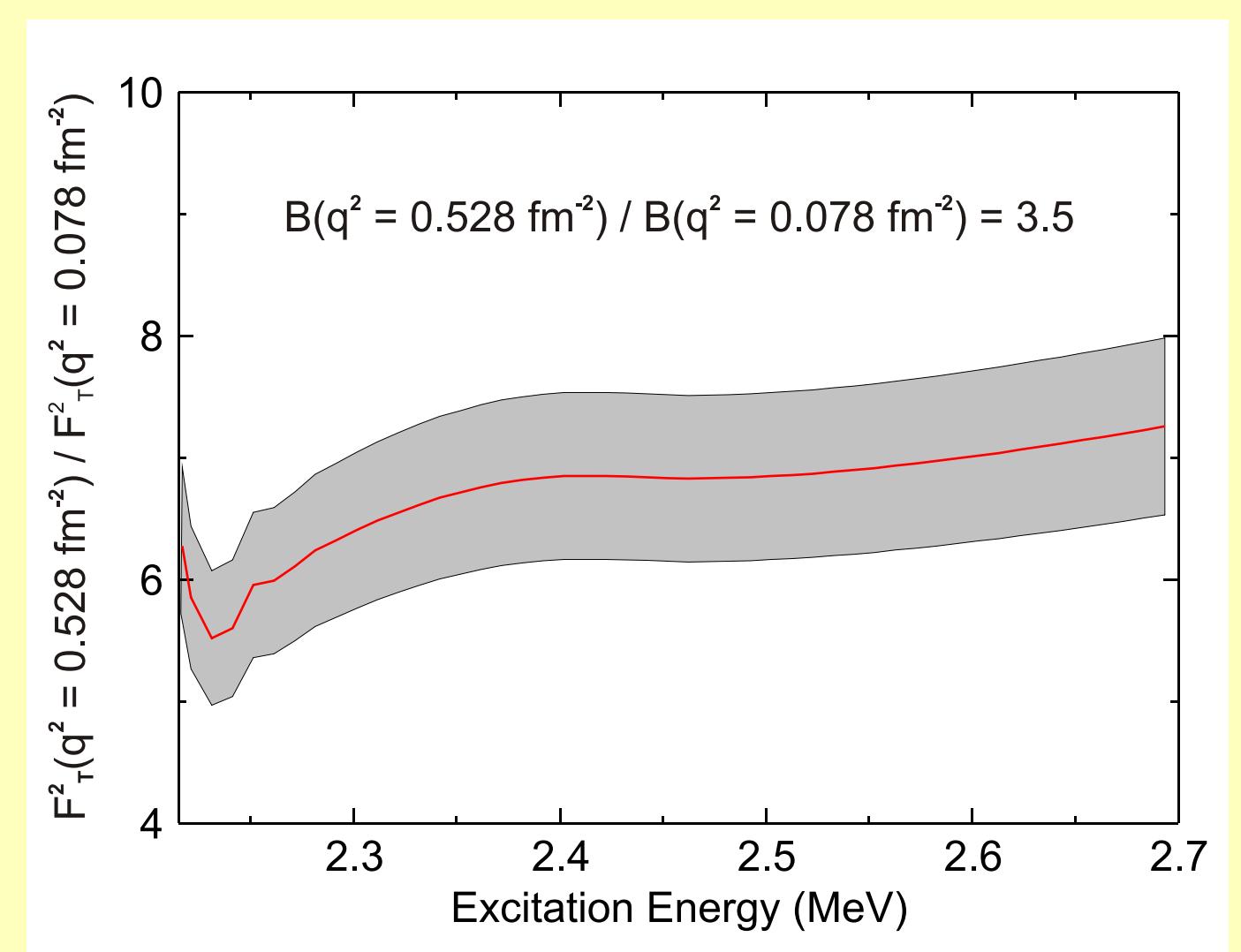
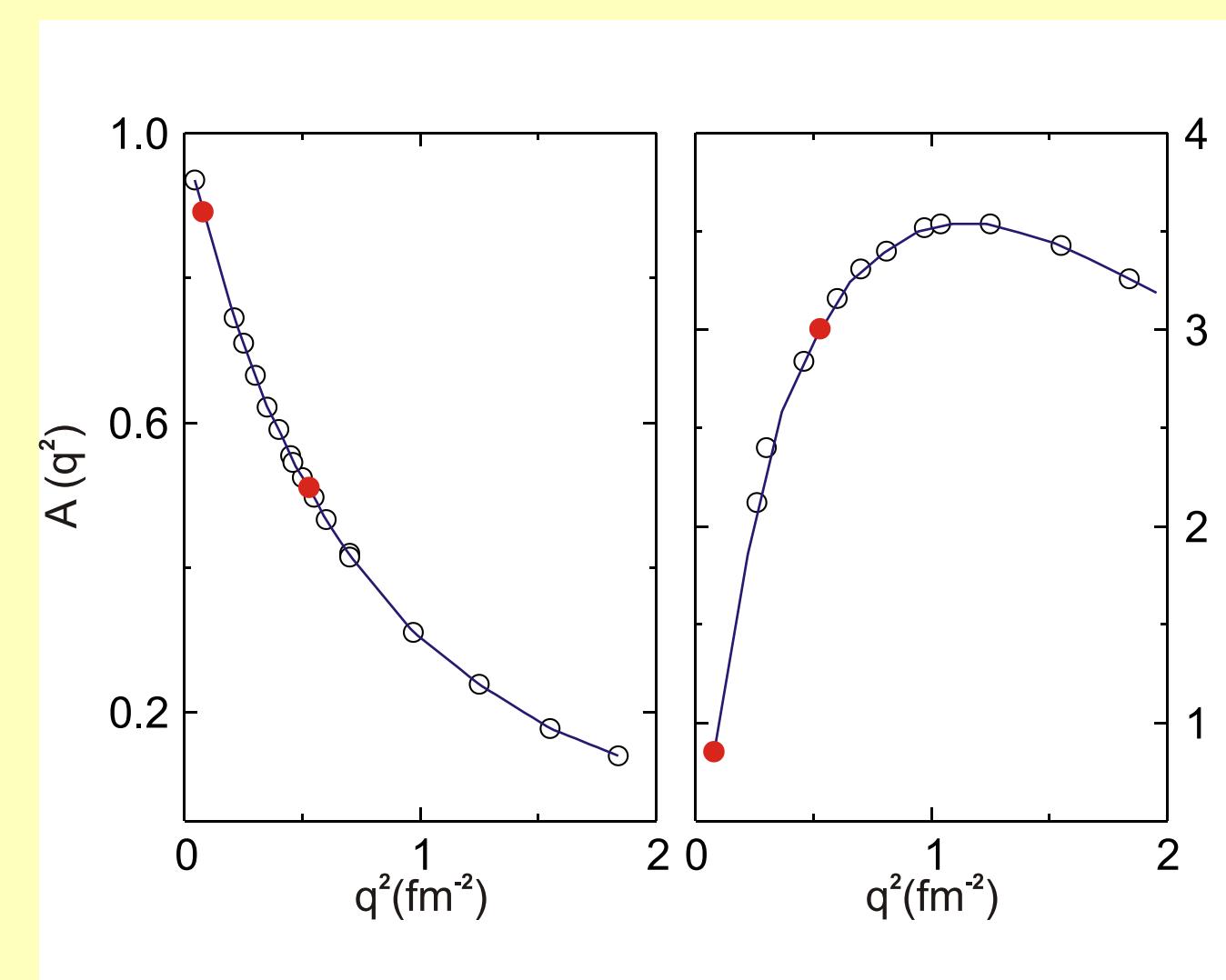
Experimental Data



- High energy resolution
- Effective background suppression

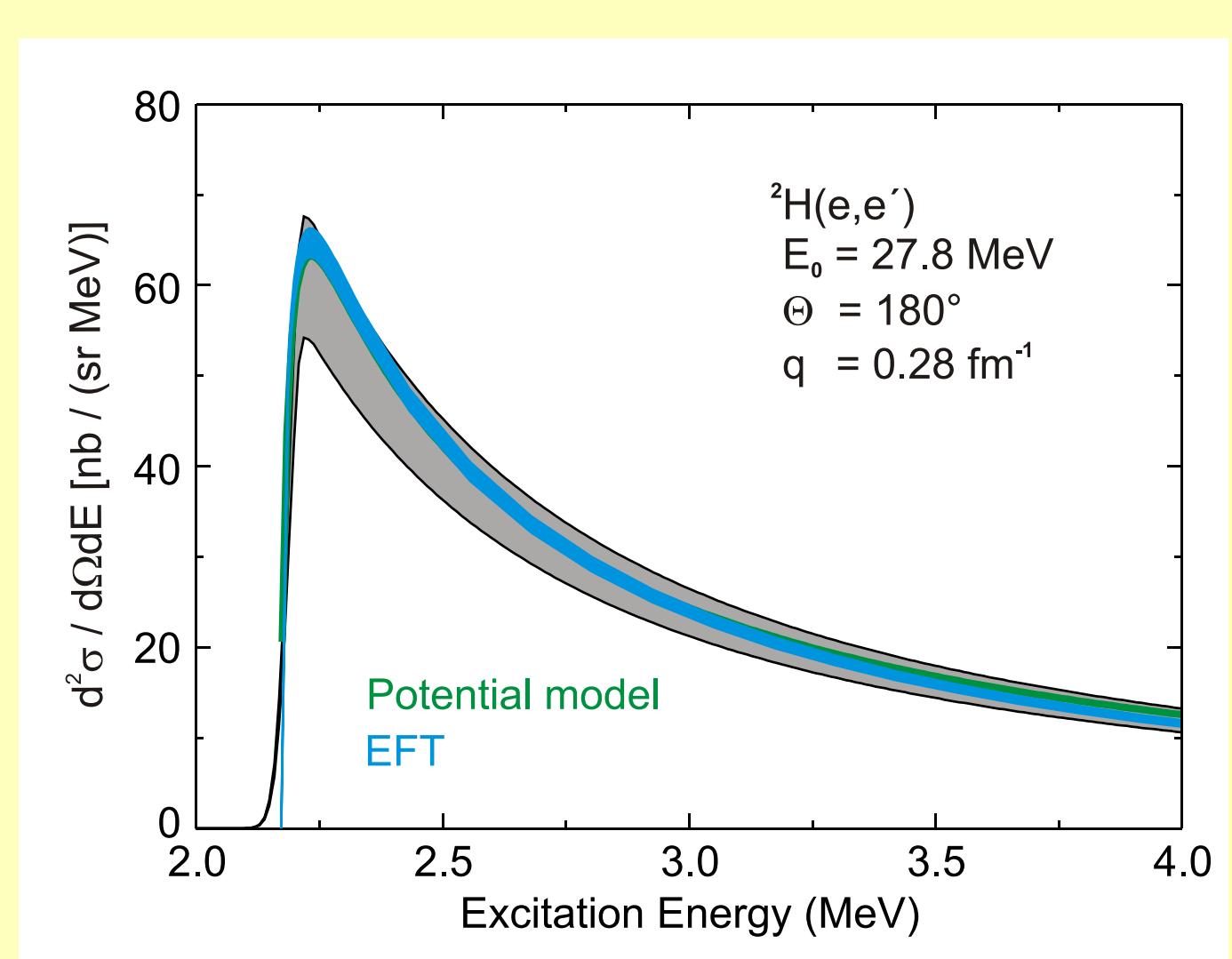


Structure Functions and Form Factors

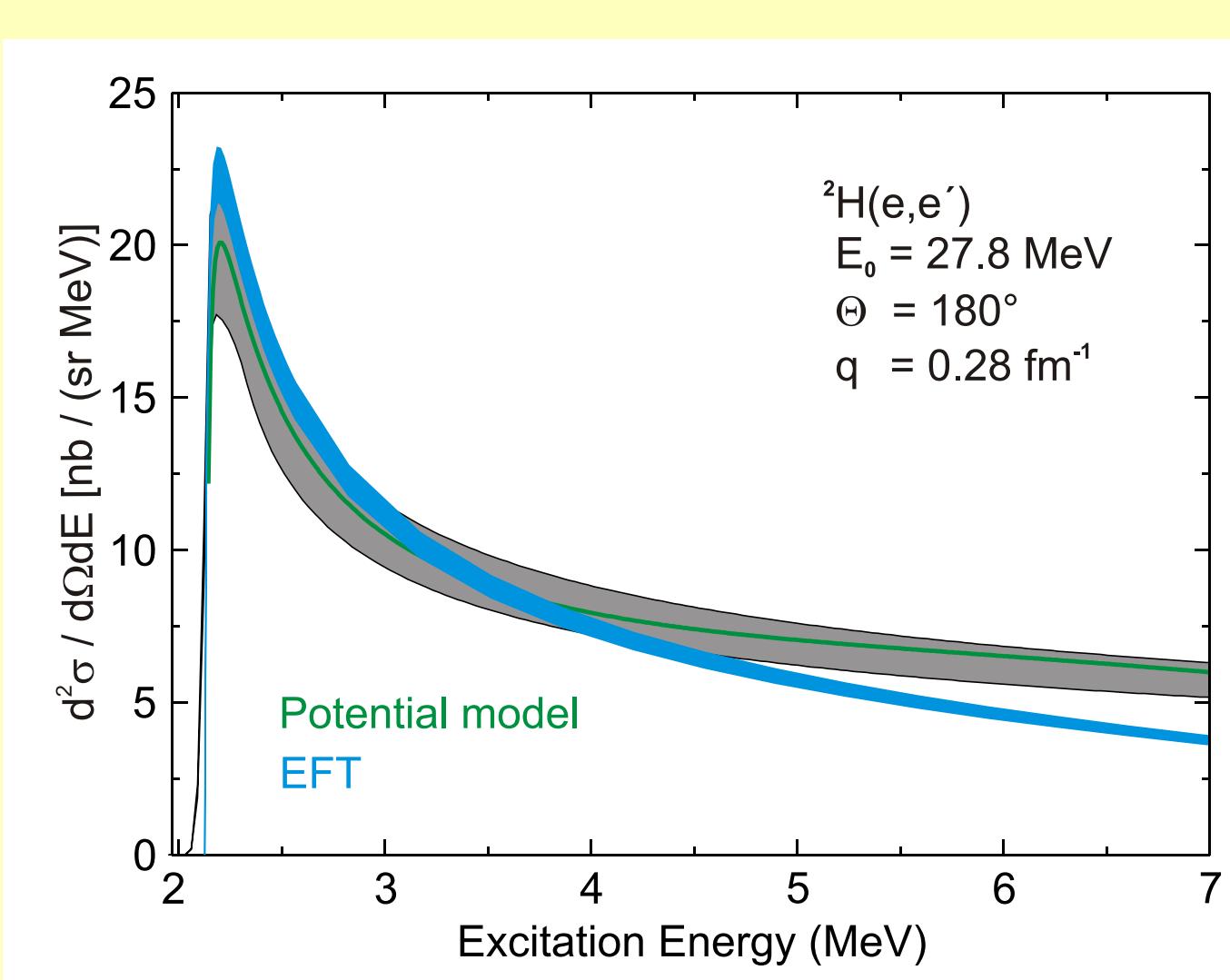


- Absolute and relative normalization agree within 5 - 6 %
- Extrapolation to the photon point

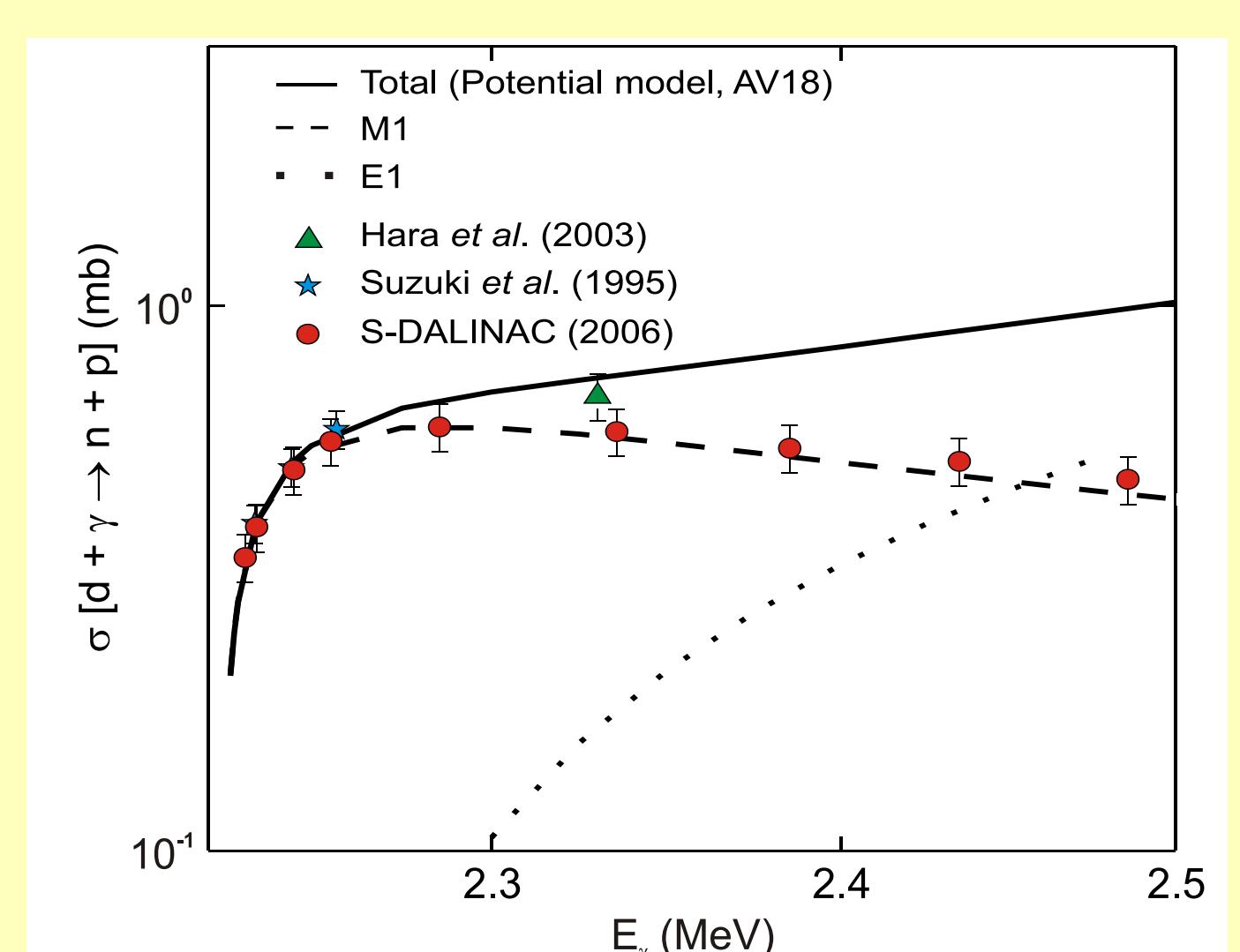
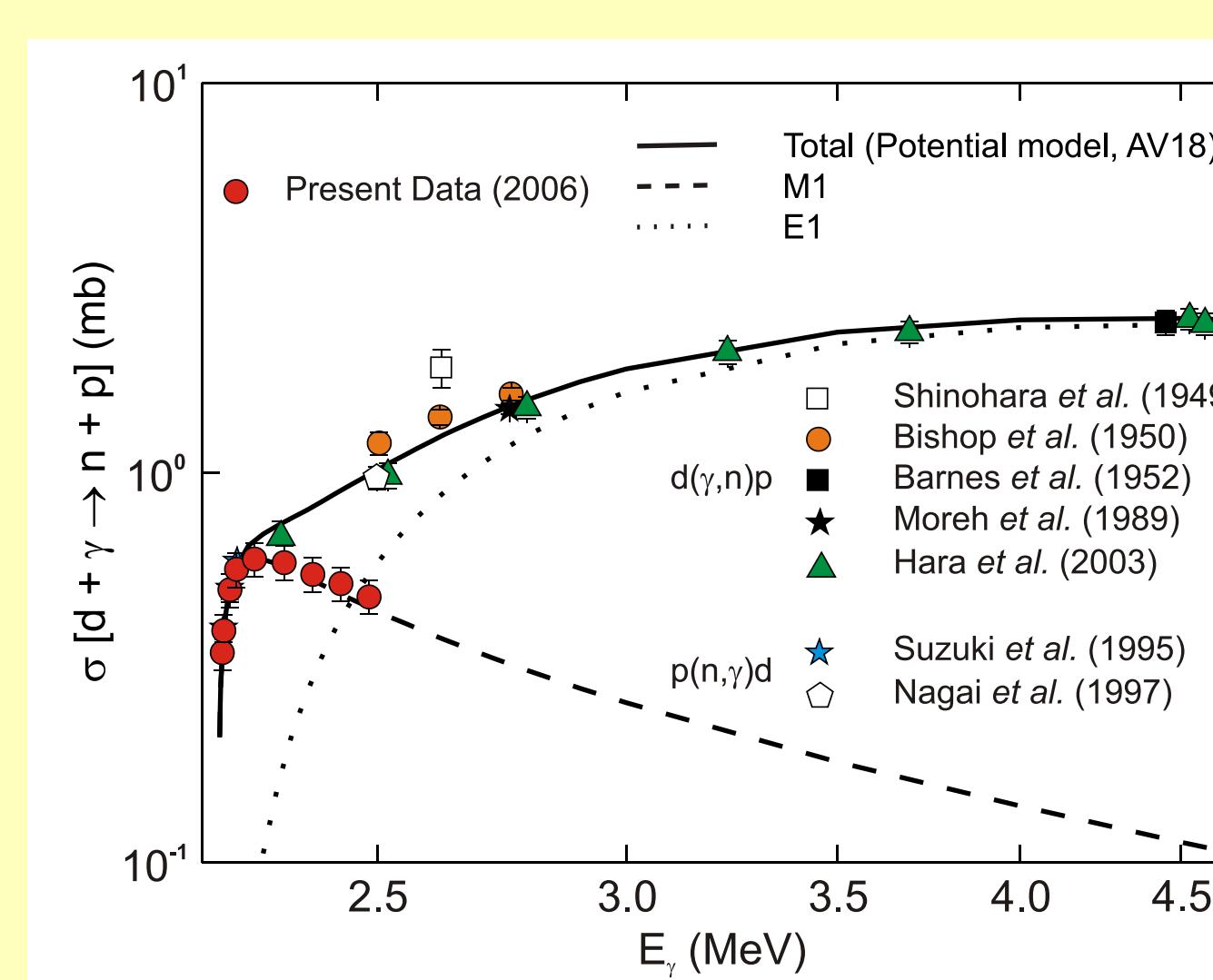
Comparison to Models



- Excellent agreement with potential model (H. Arenhövel)
- Deviations for EFT (H. Griesshammer) at higher q



Importance for Big-Bang Nucleosynthesis



- BBN relevant energy window
- Precision test of modern theoretical models (potential model, EFT)

