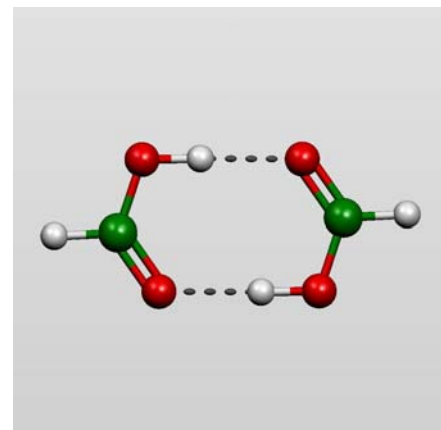
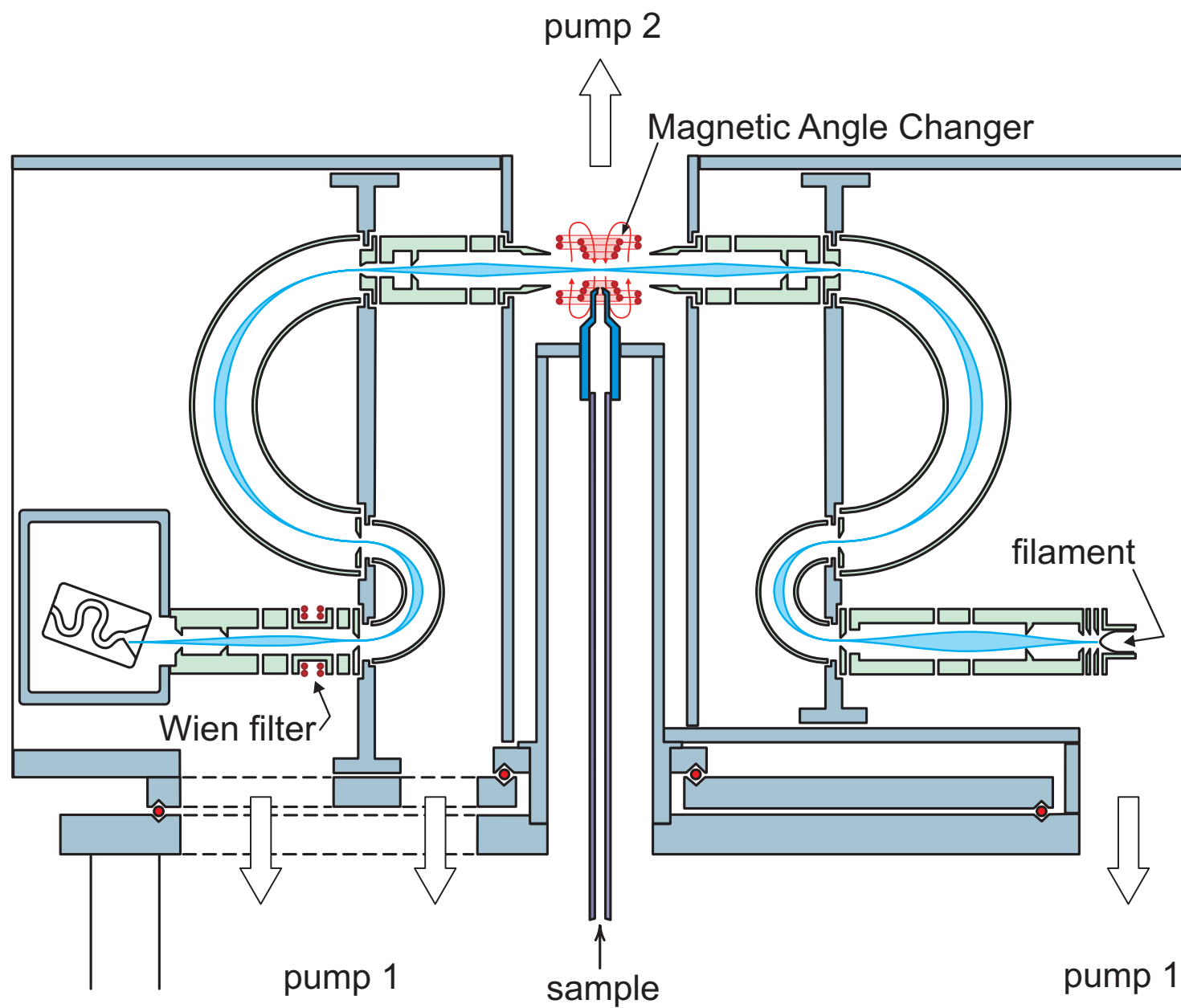


Improved techniques of measuring accurate electron - molecule cross sections near threshold and over a large angular range

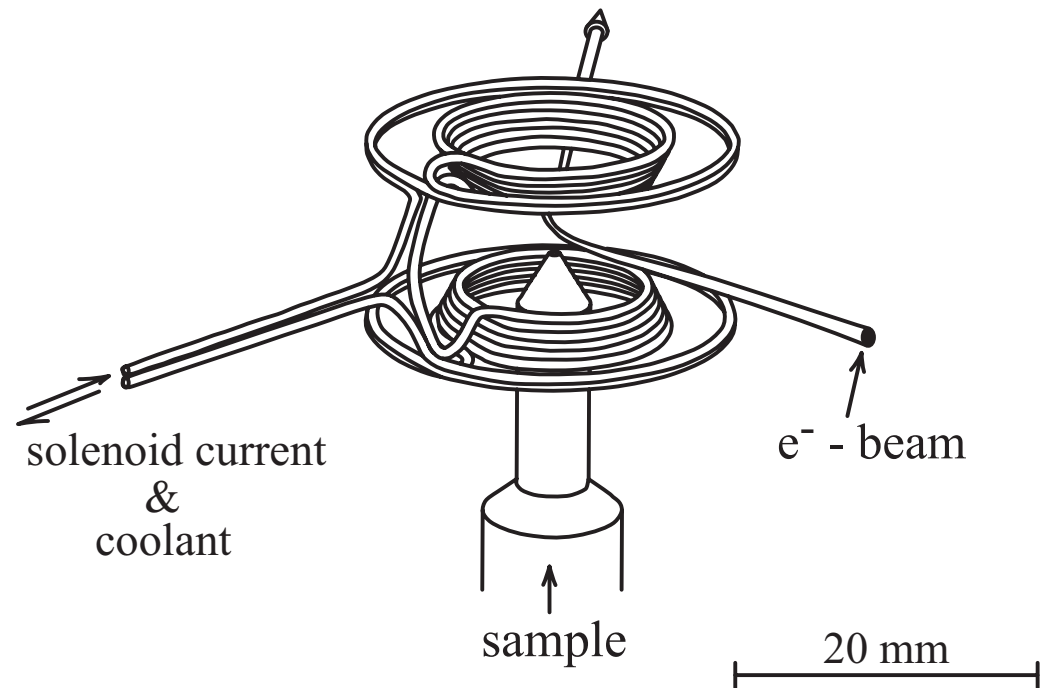
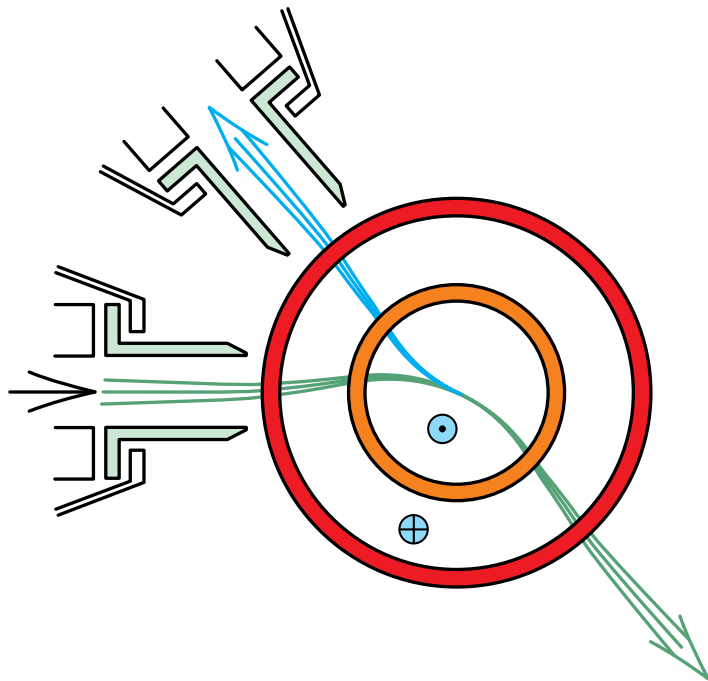
- Measuring cross sections at low energies and over a wide angular range
- Nitrogen N_2
- Methane CH_4
- Neopentane $\text{C}(\text{CH}_3)_4$
- Conclusions and outlook

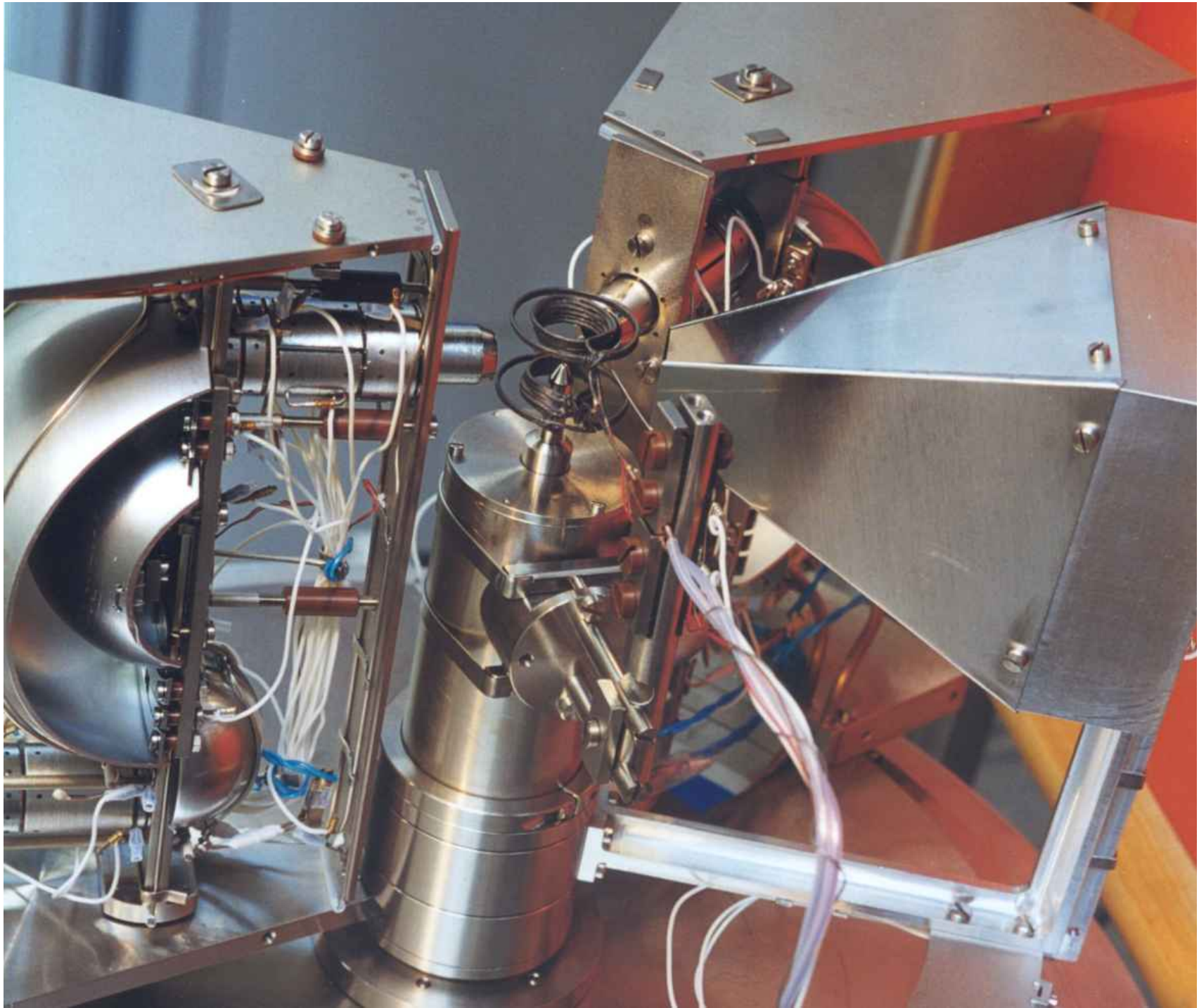
time permitting



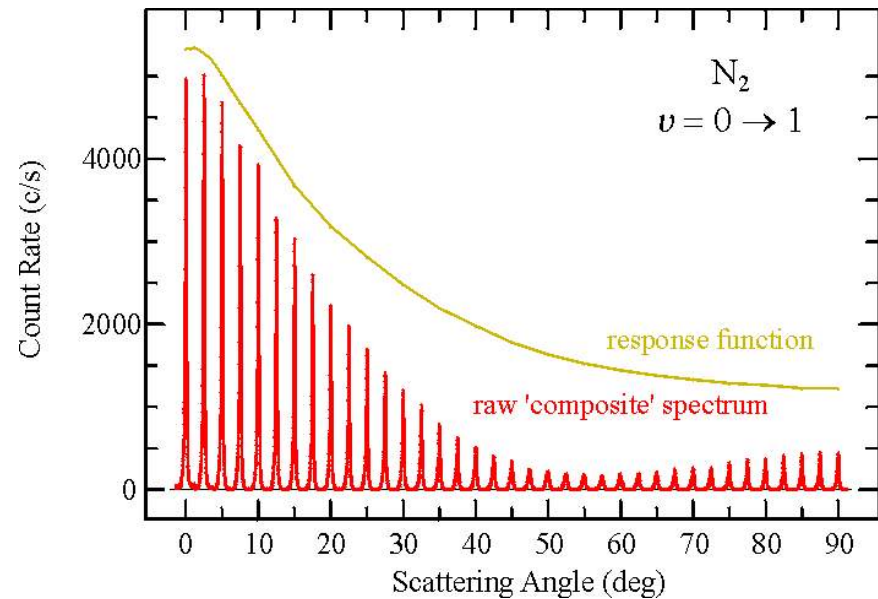
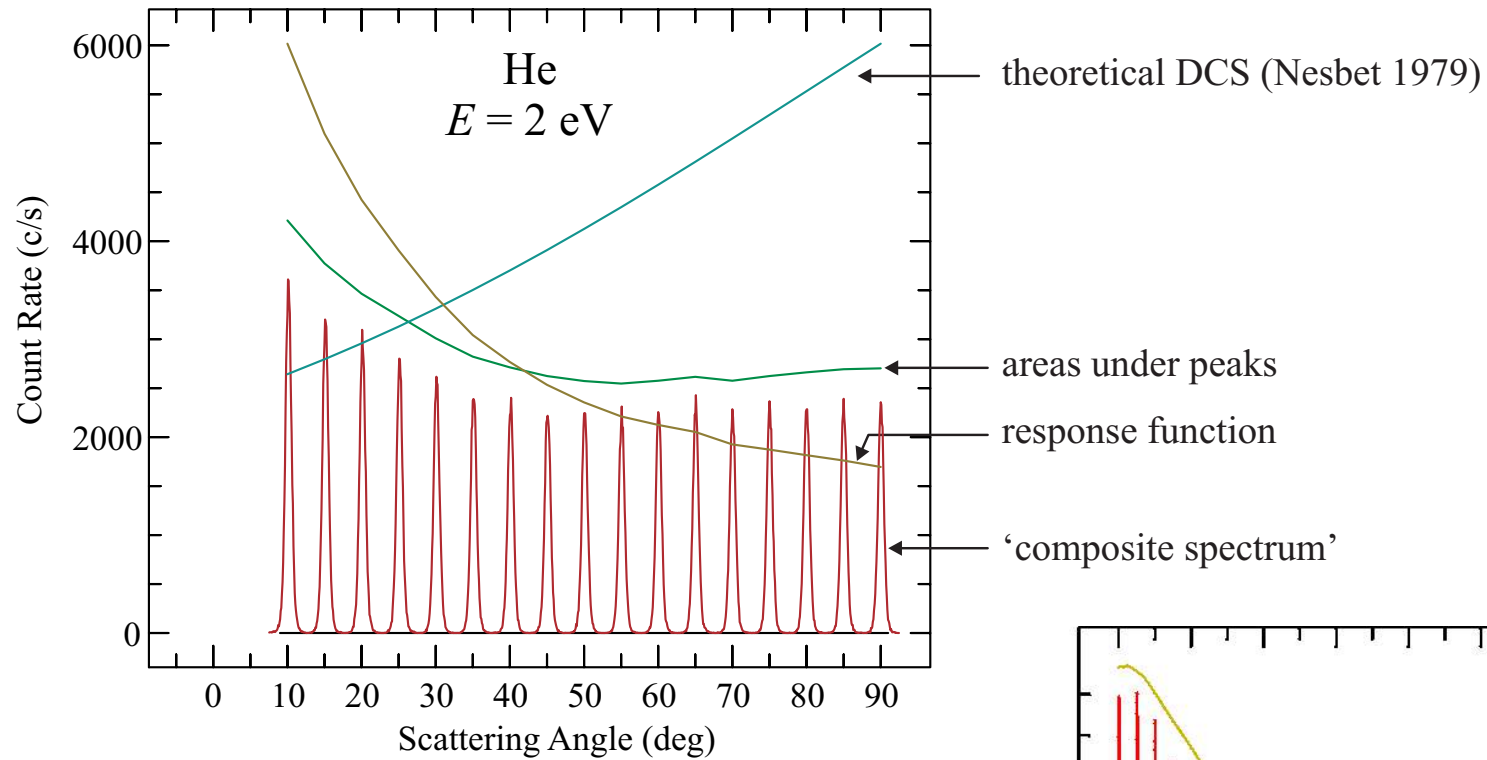


The Magnetic Angle Changer

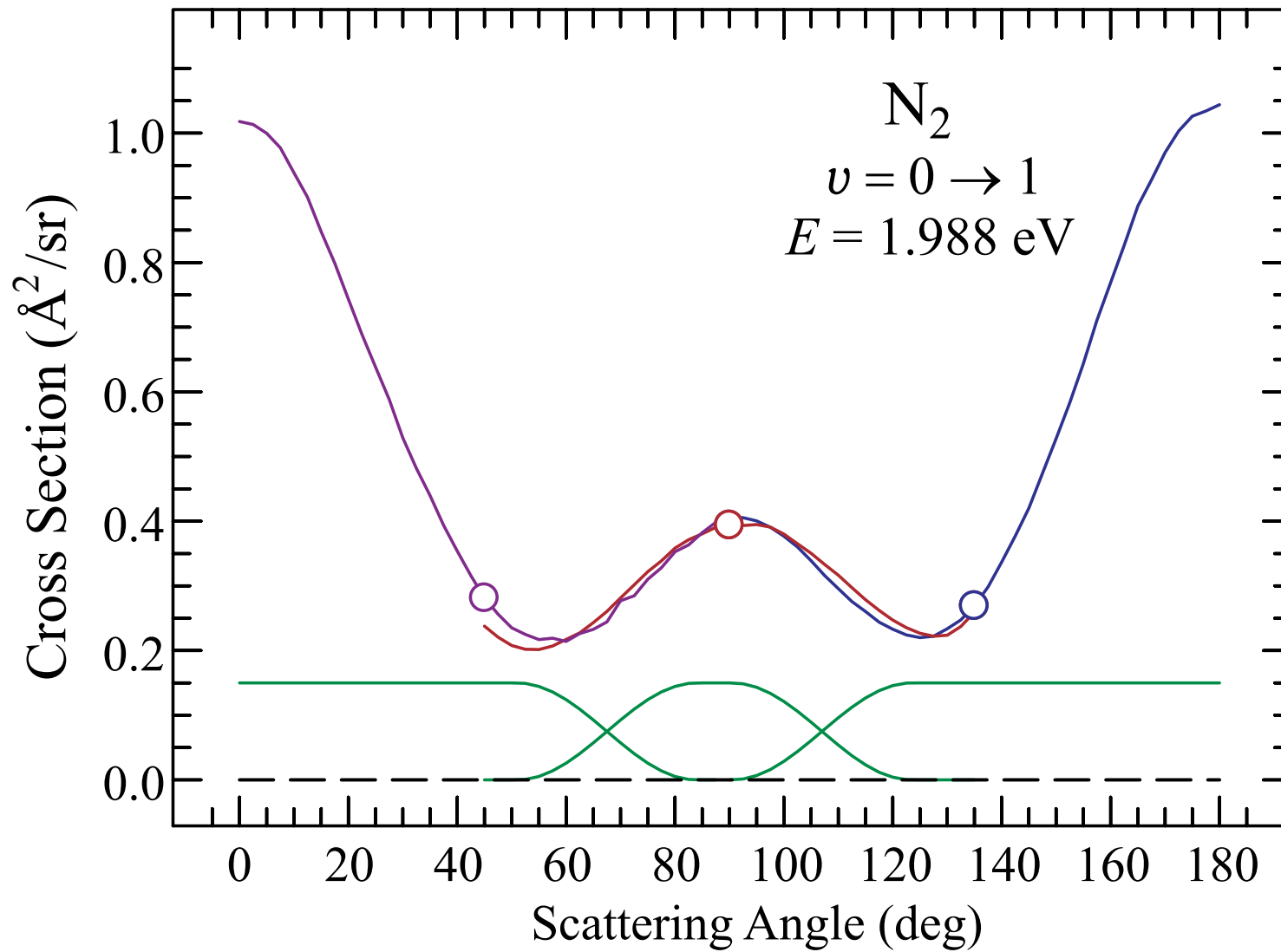




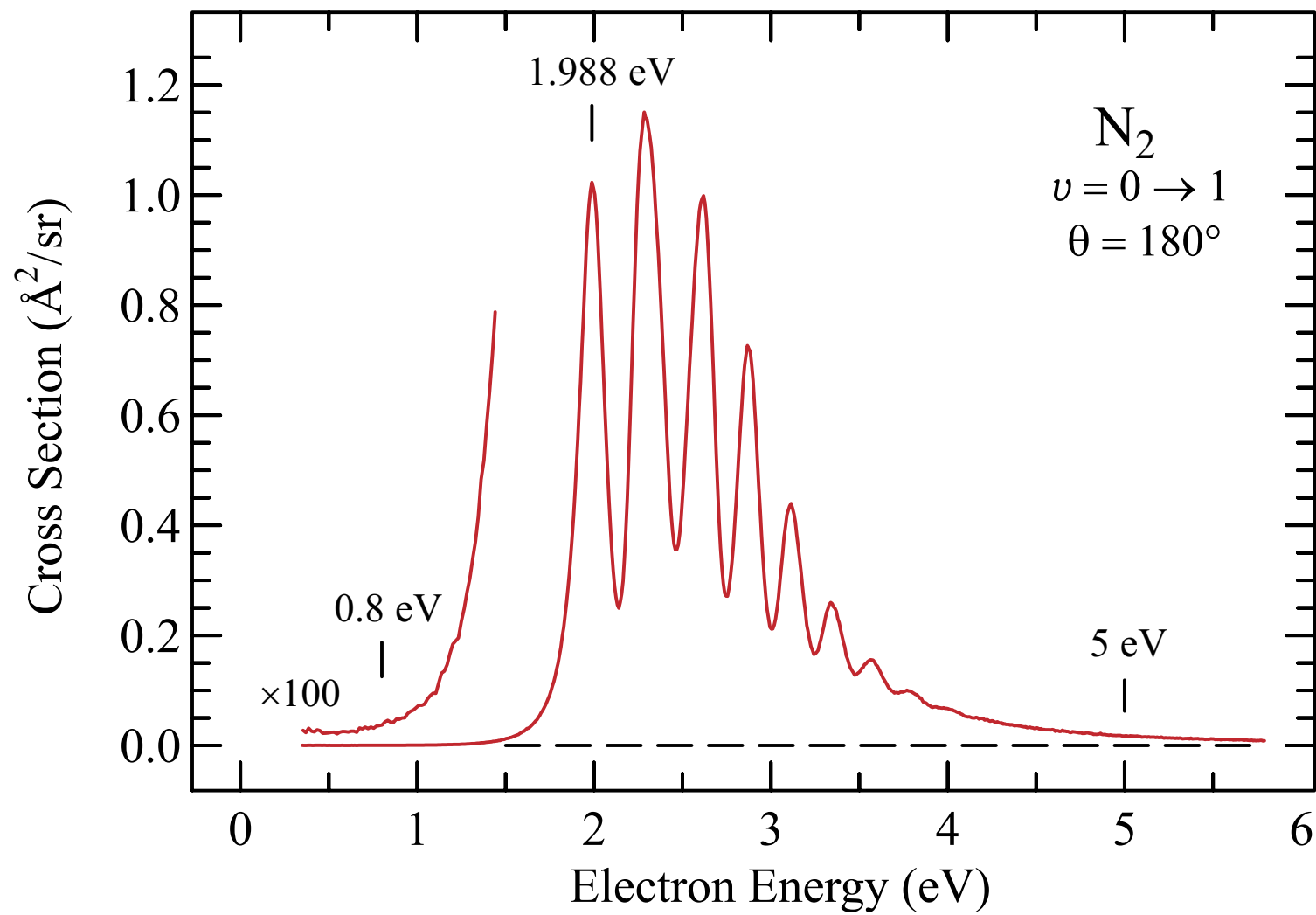
Normalizing to He



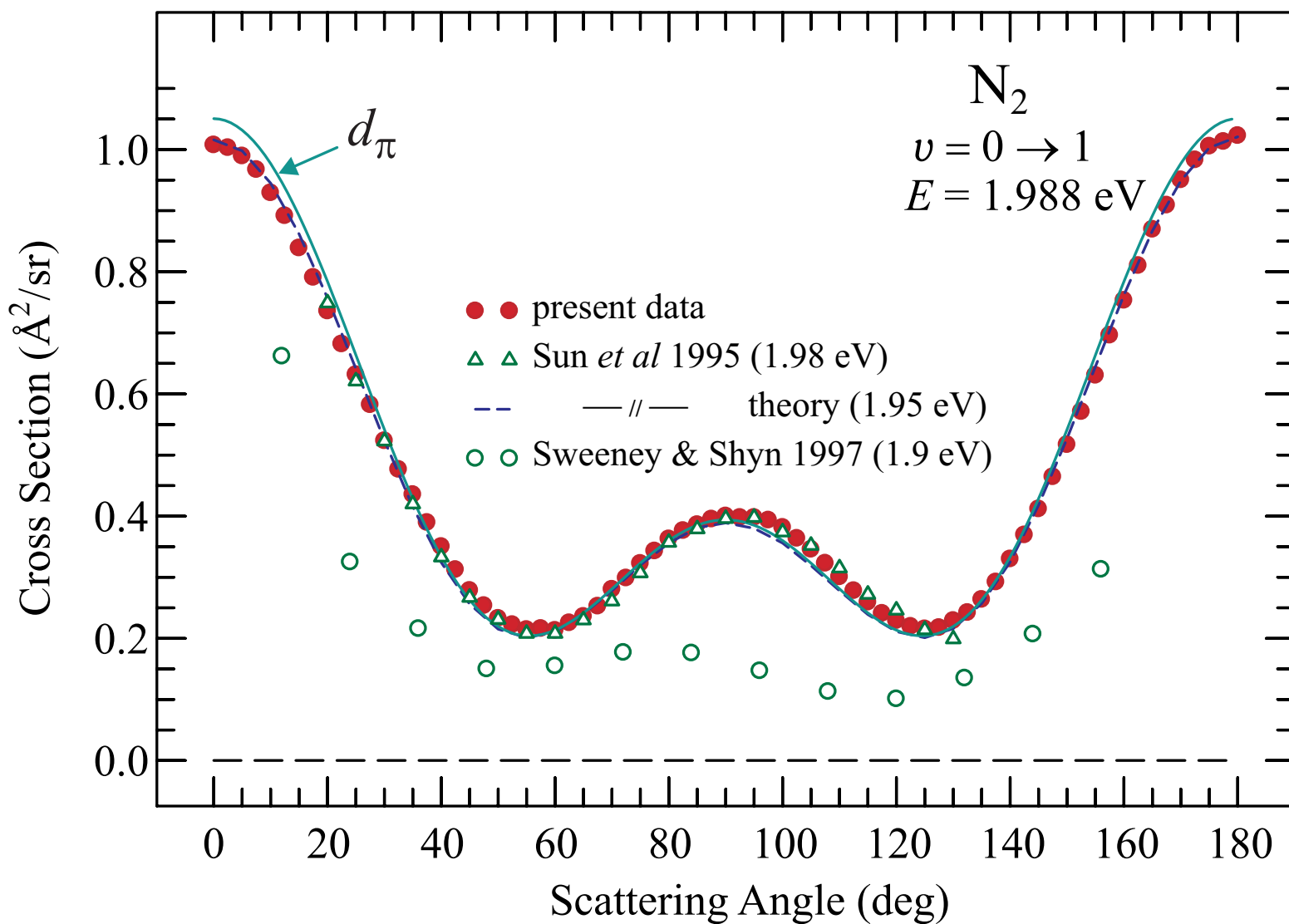
Joining the segments and absolute values



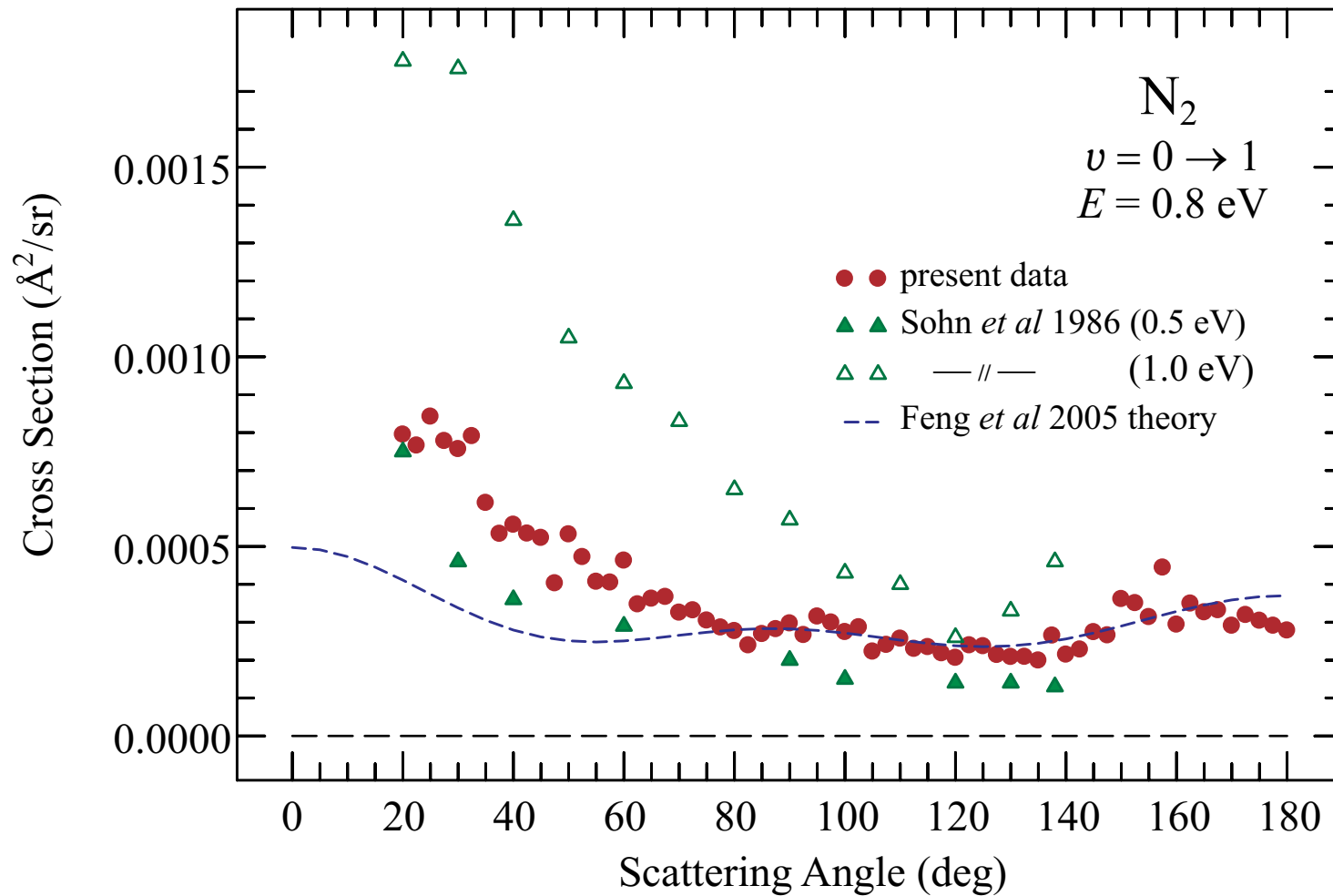
N_2 – vibrational excitation



N_2 – vibrational excitation

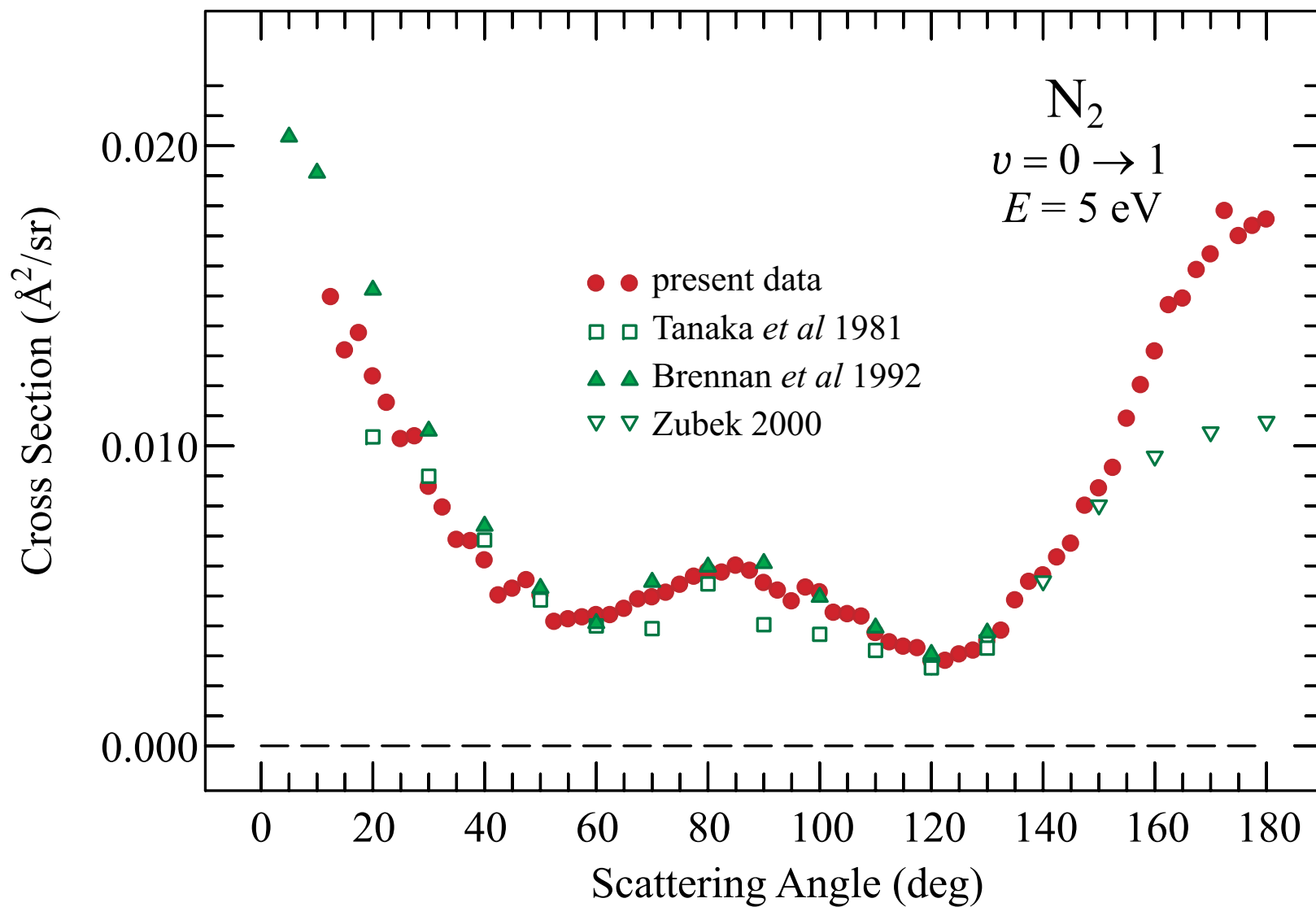


N_2 – vibrational excitation

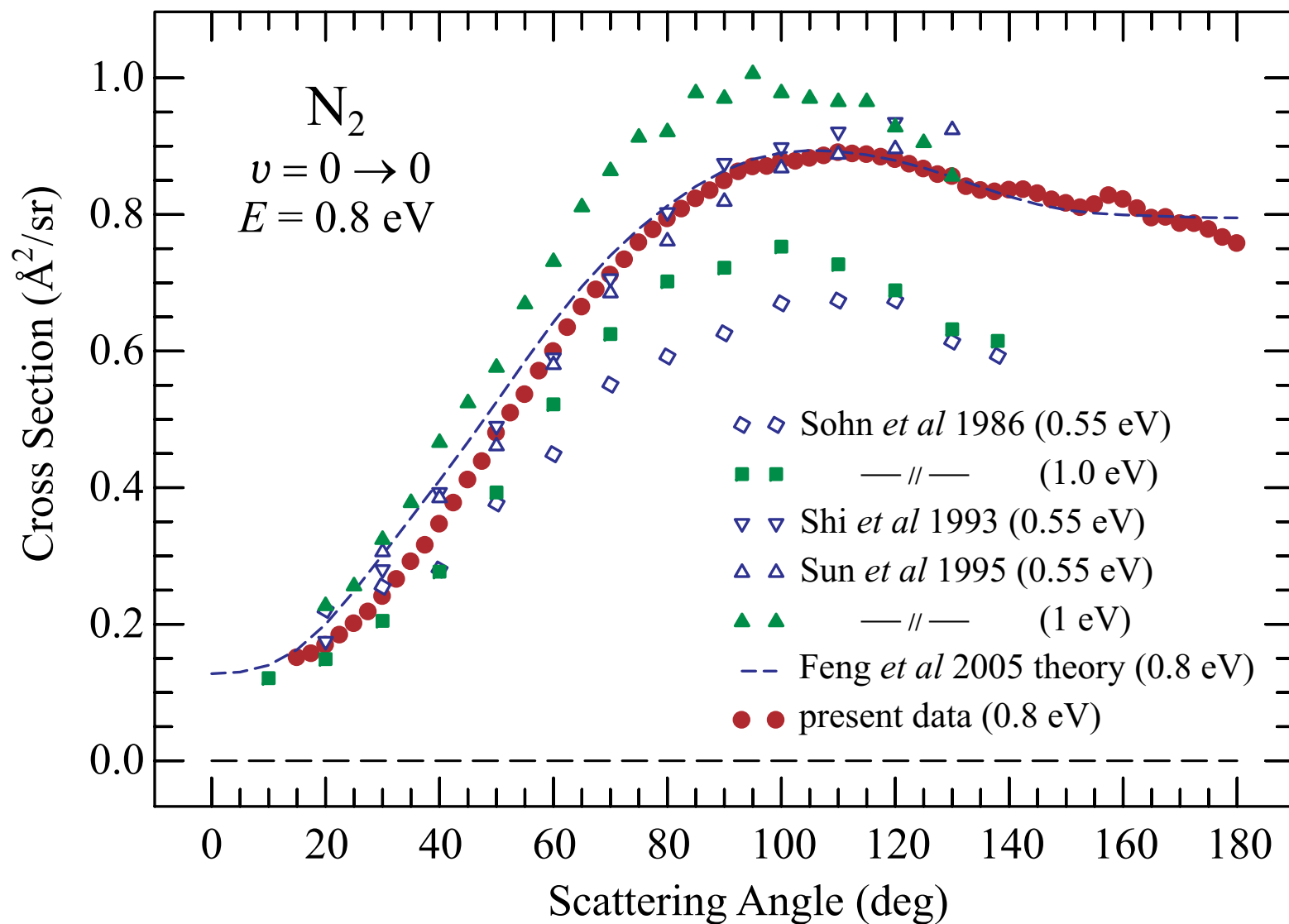


Feng, Sun, Morrison: vibrational close coupling (VCC) calculations,
“distributed spherical Gaussian” DSG correlation-polarization potential
(as opposed to “better-than-adiabatic-dipole” BTAD)

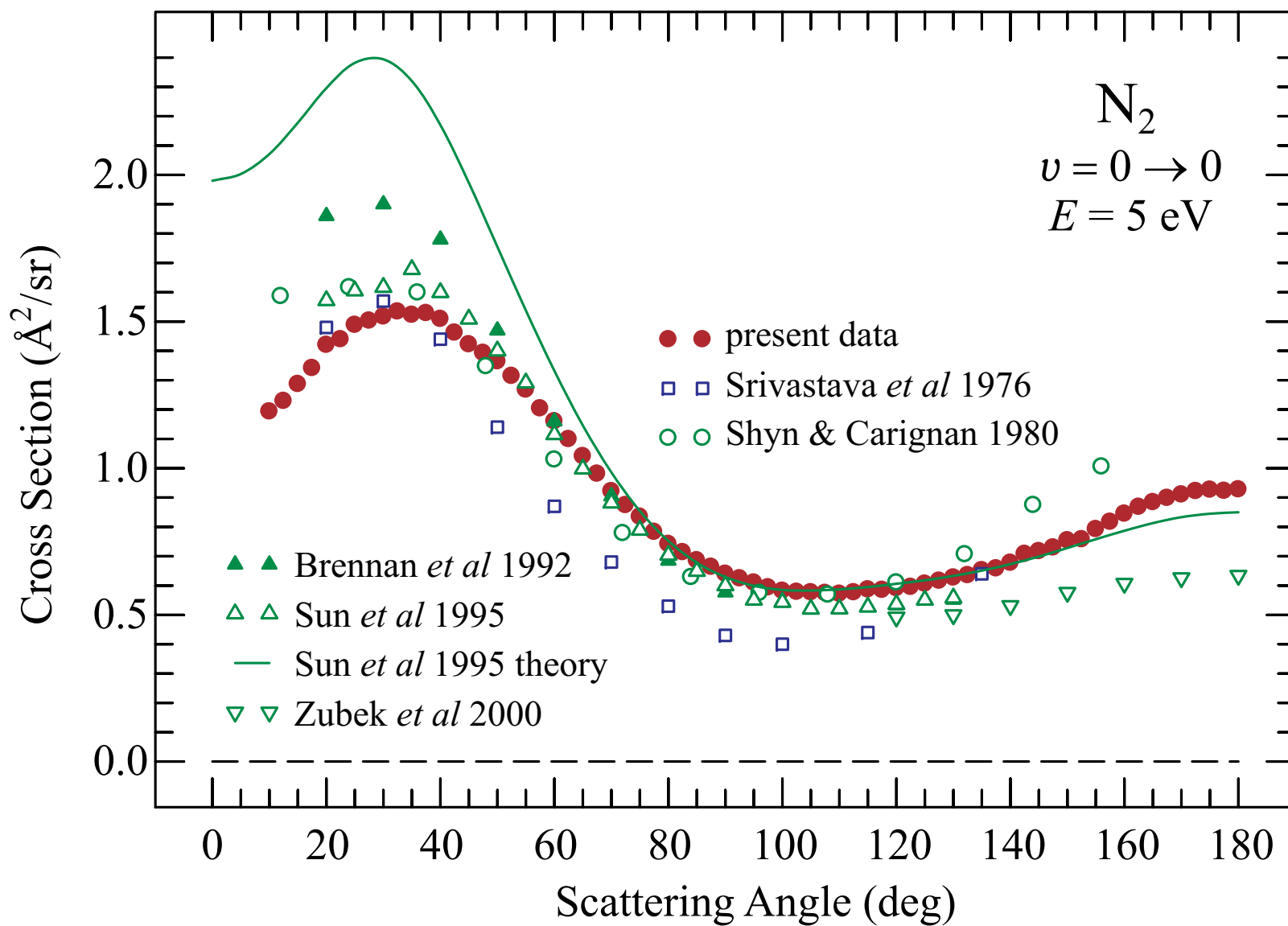
N_2 – vibrational excitation



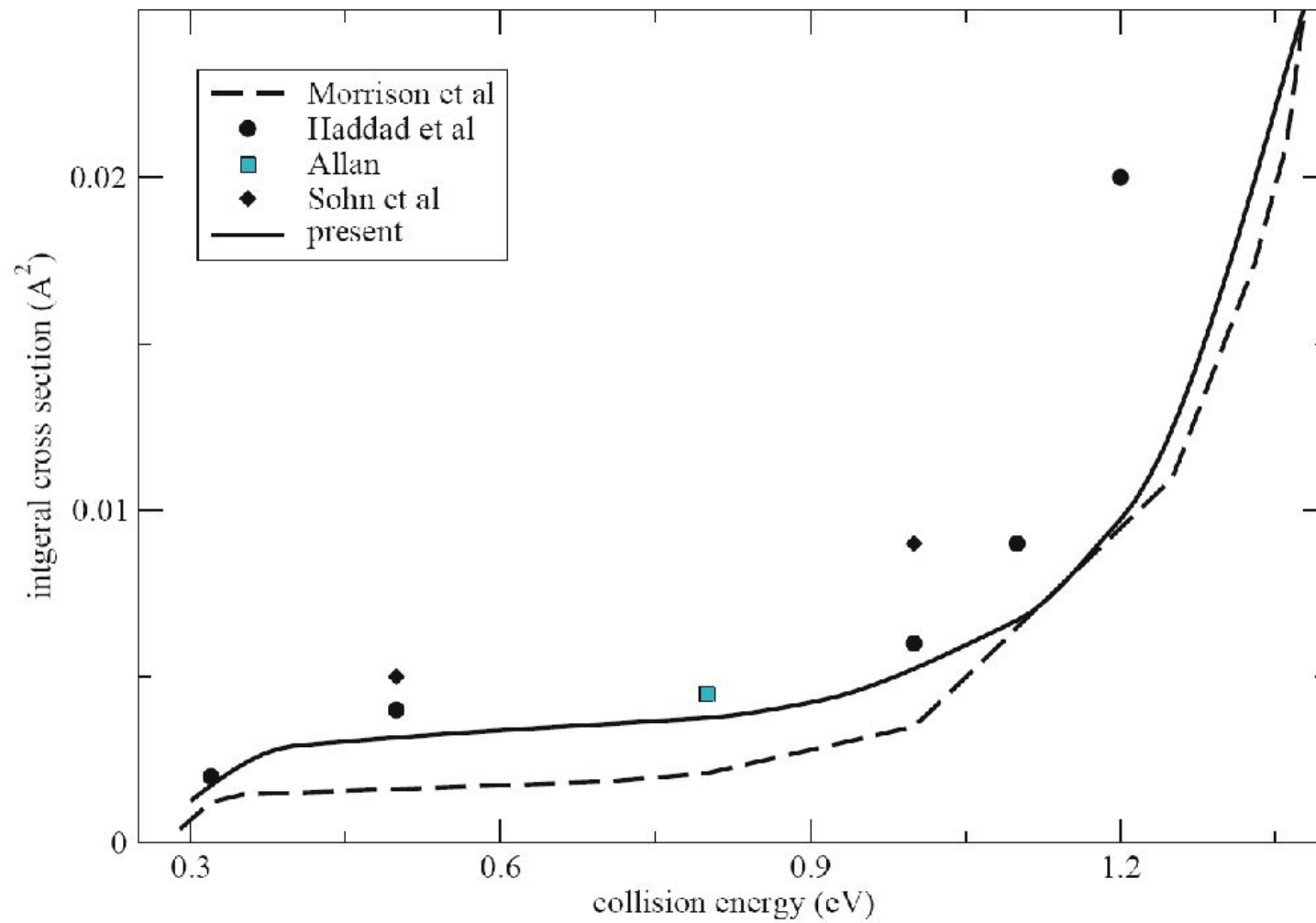
N_2 – elastic scattering



N_2 – elastic scattering

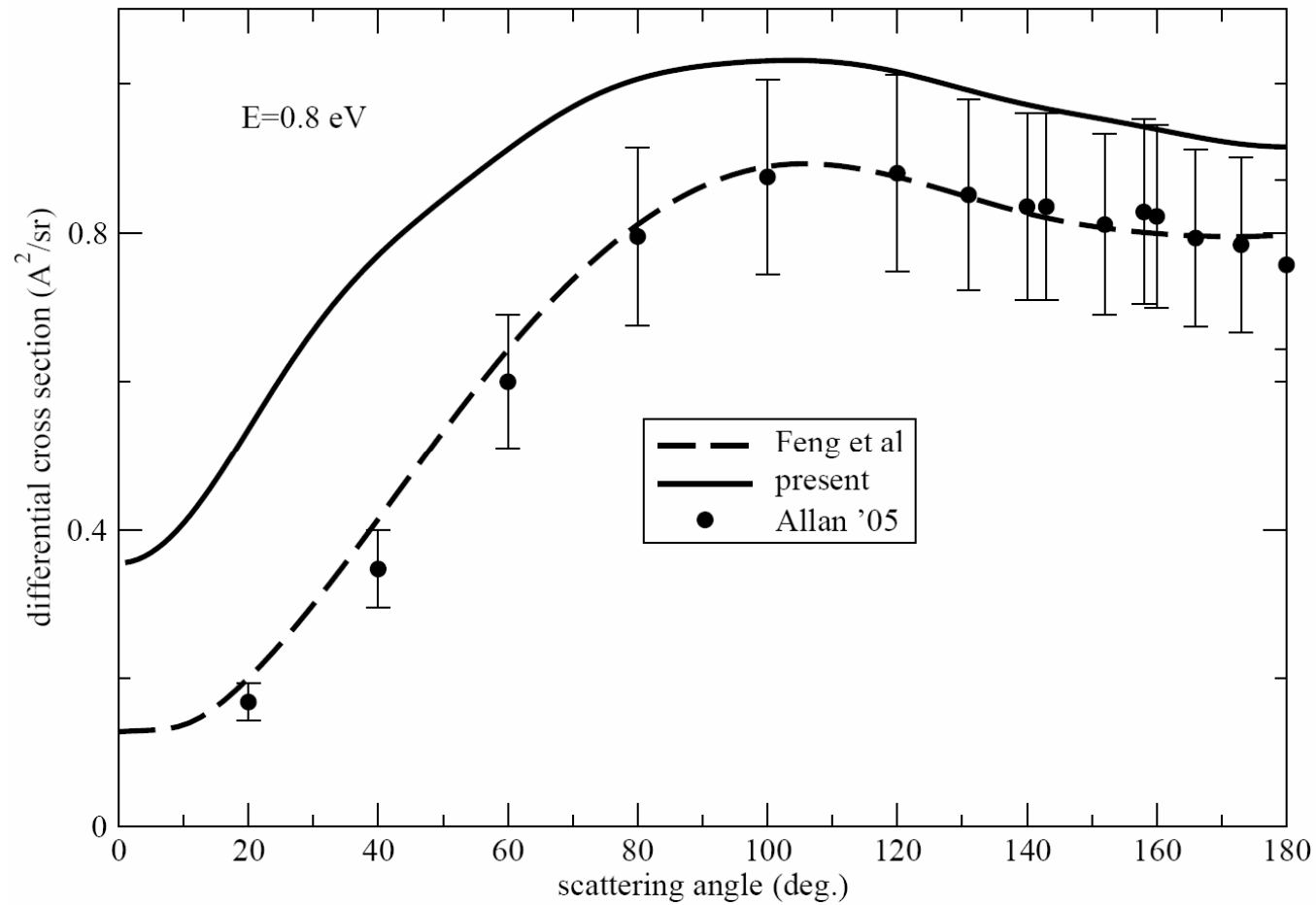


Integral cross section below resonance

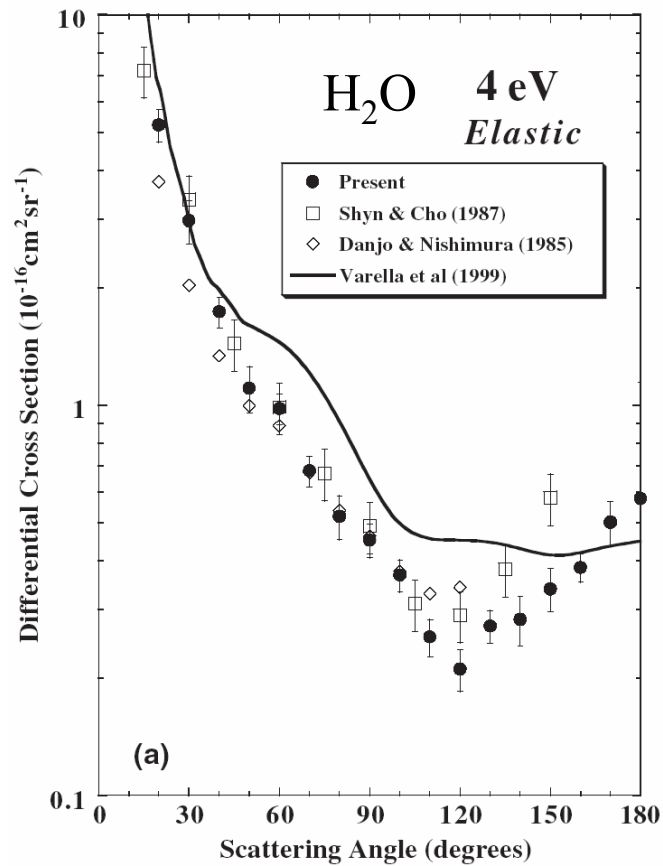


Telega and Gianturco, *Eur J Phys D* 2006, *in print*

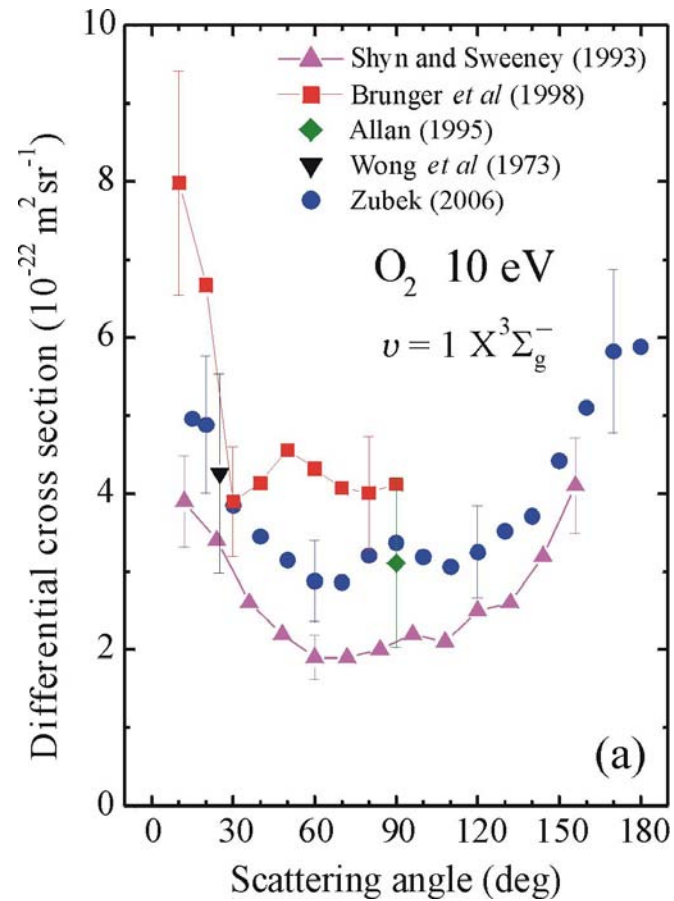
Integral cross section below resonance



Magnetic angle changer in other groups

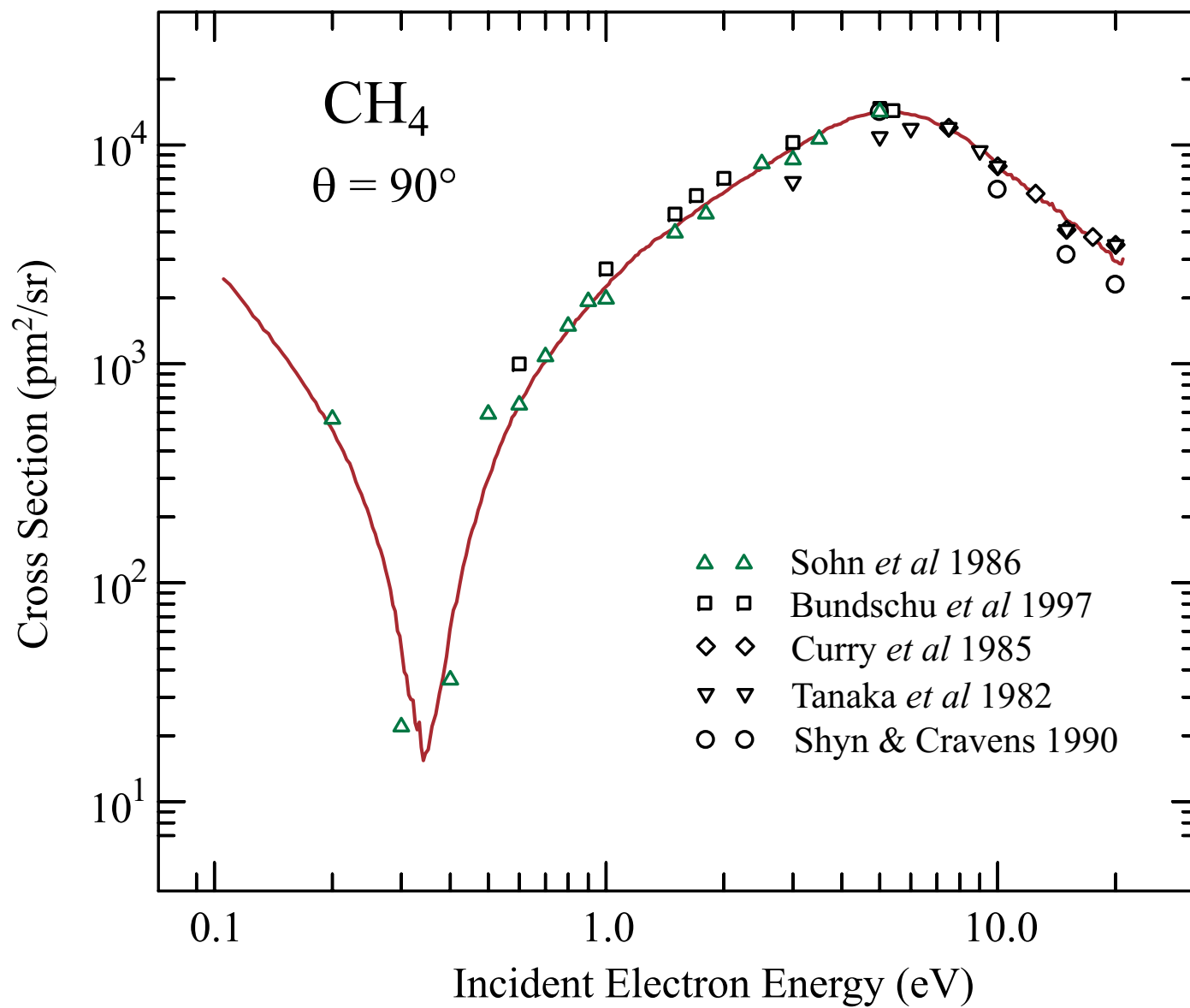


Cho, Park, Tanaka and Buckman, *J Phys B* 2004

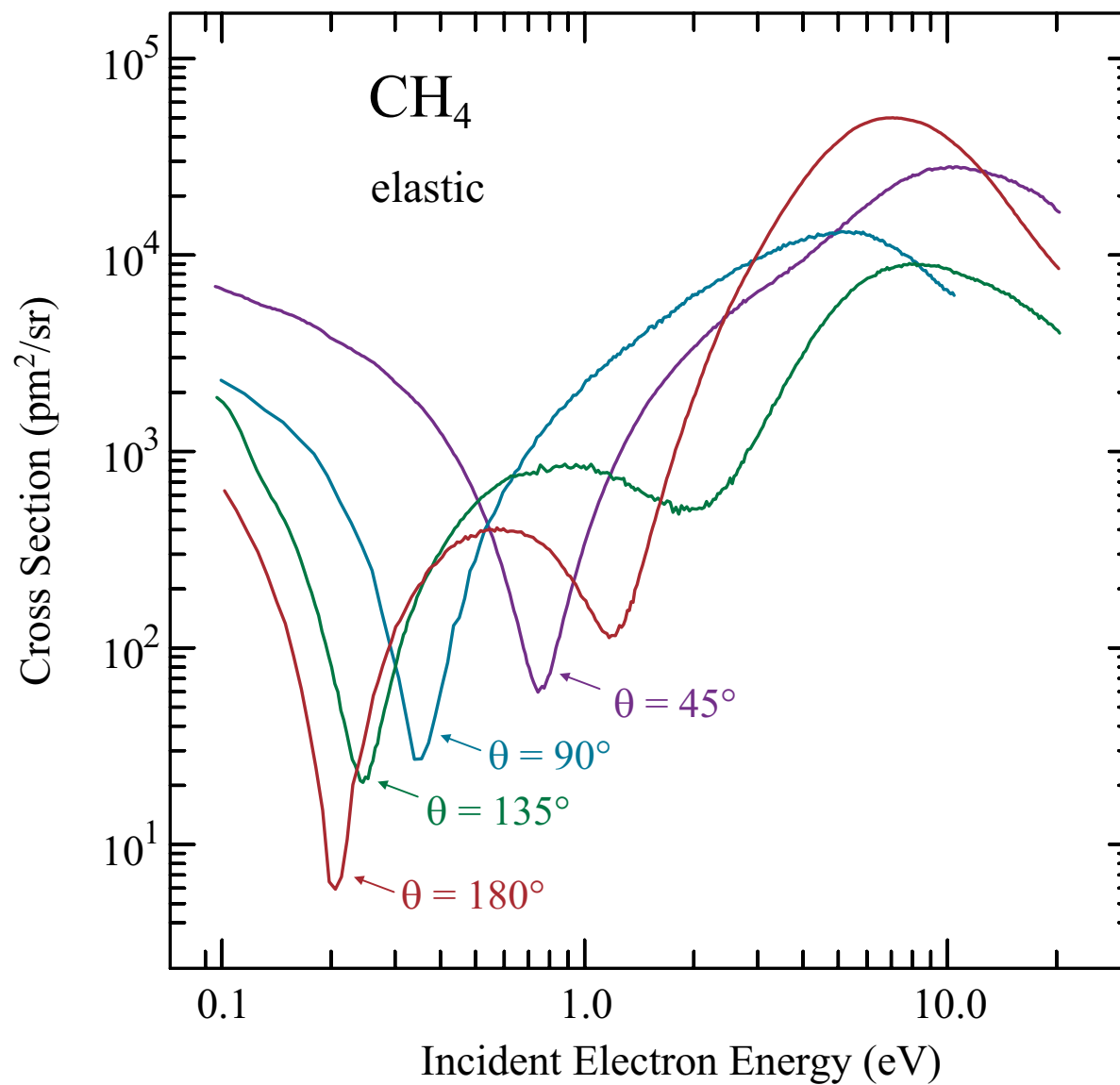


Linert and Zubek, *J Phys B* 2006, *in print*

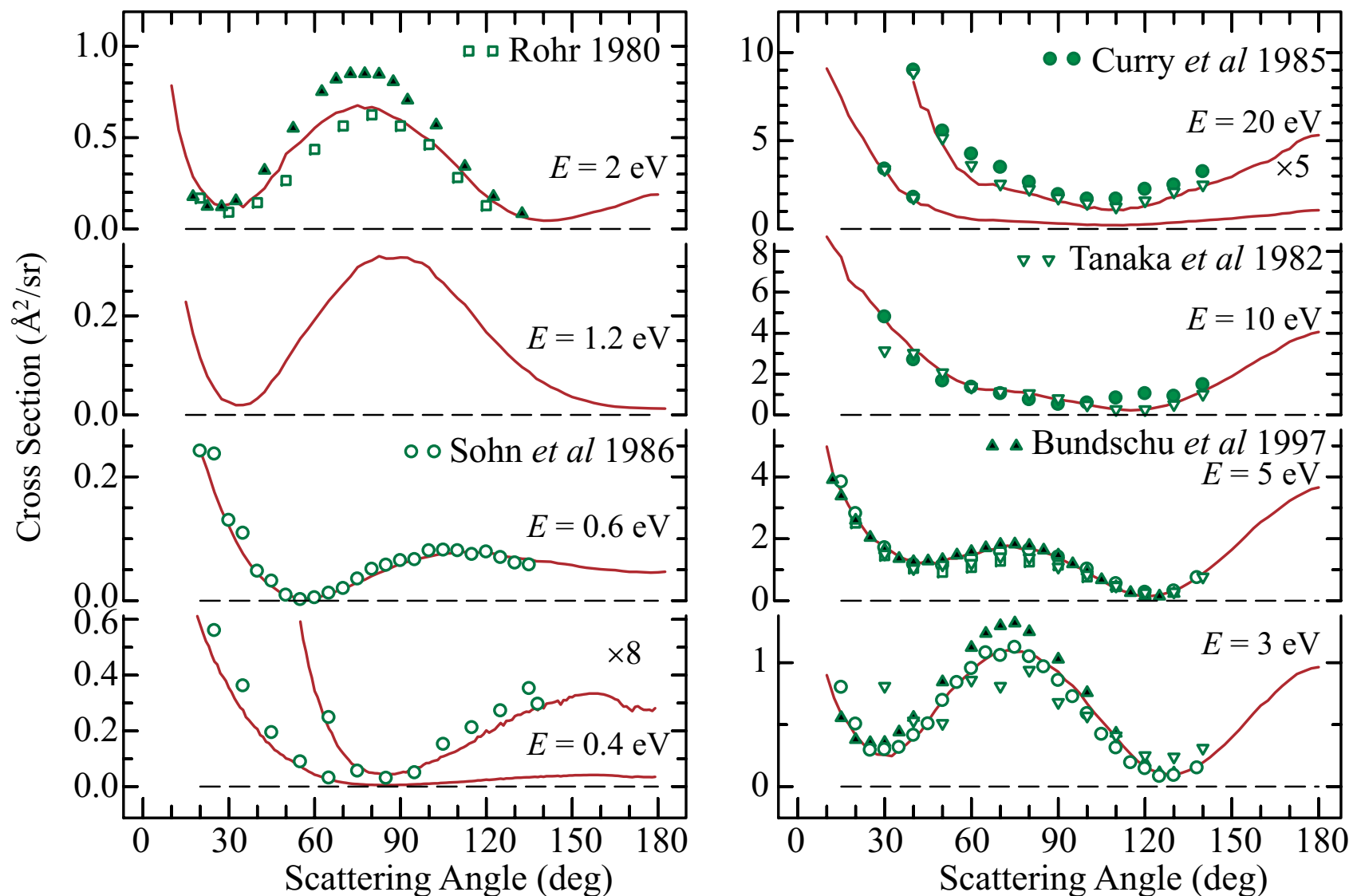
Elastic cross section in CH₄



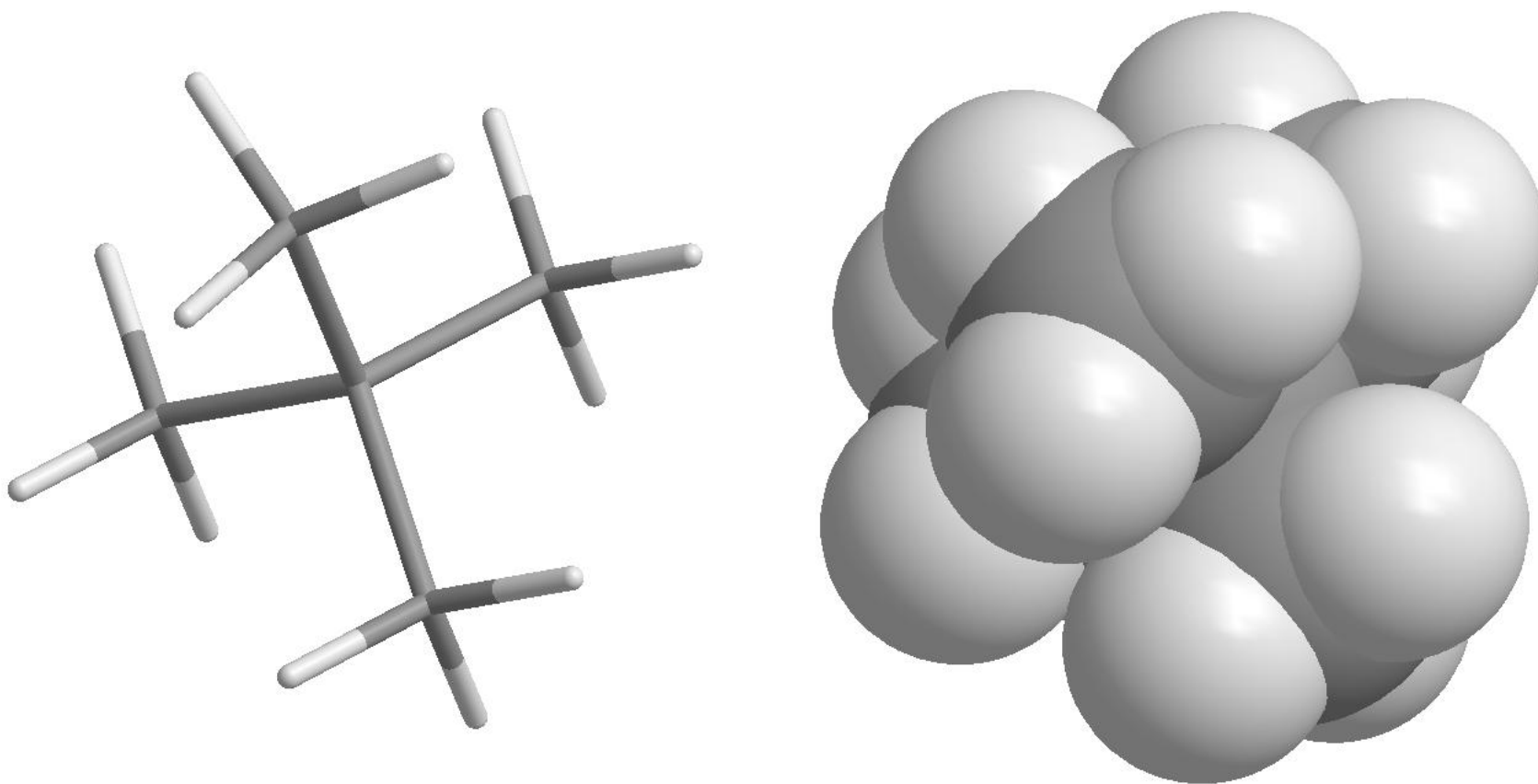
Elastic cross sections in CH₄



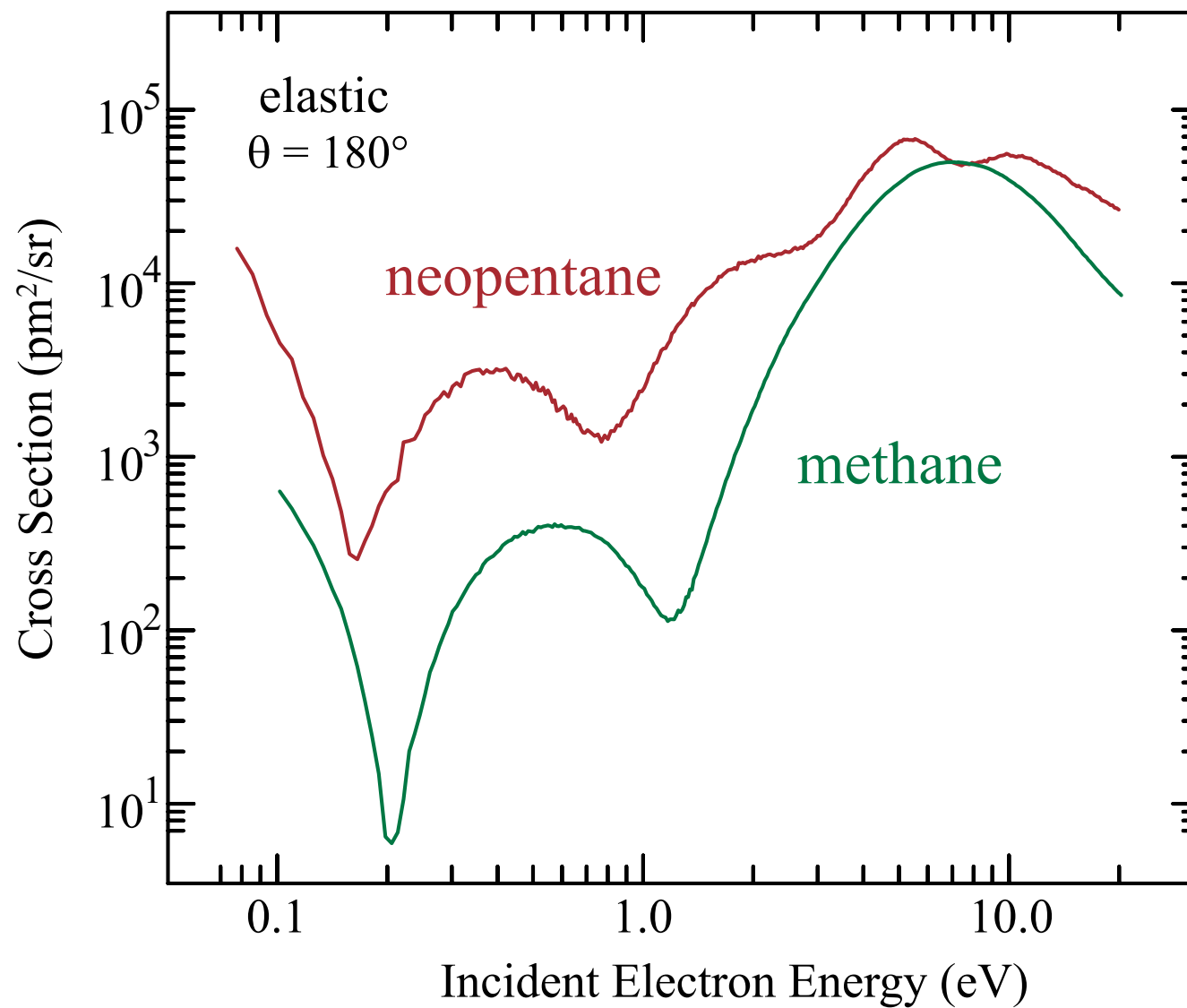
Elastic cross sections in CH₄



Electron scattering in neopentane $\text{C}(\text{CH}_3)_4$

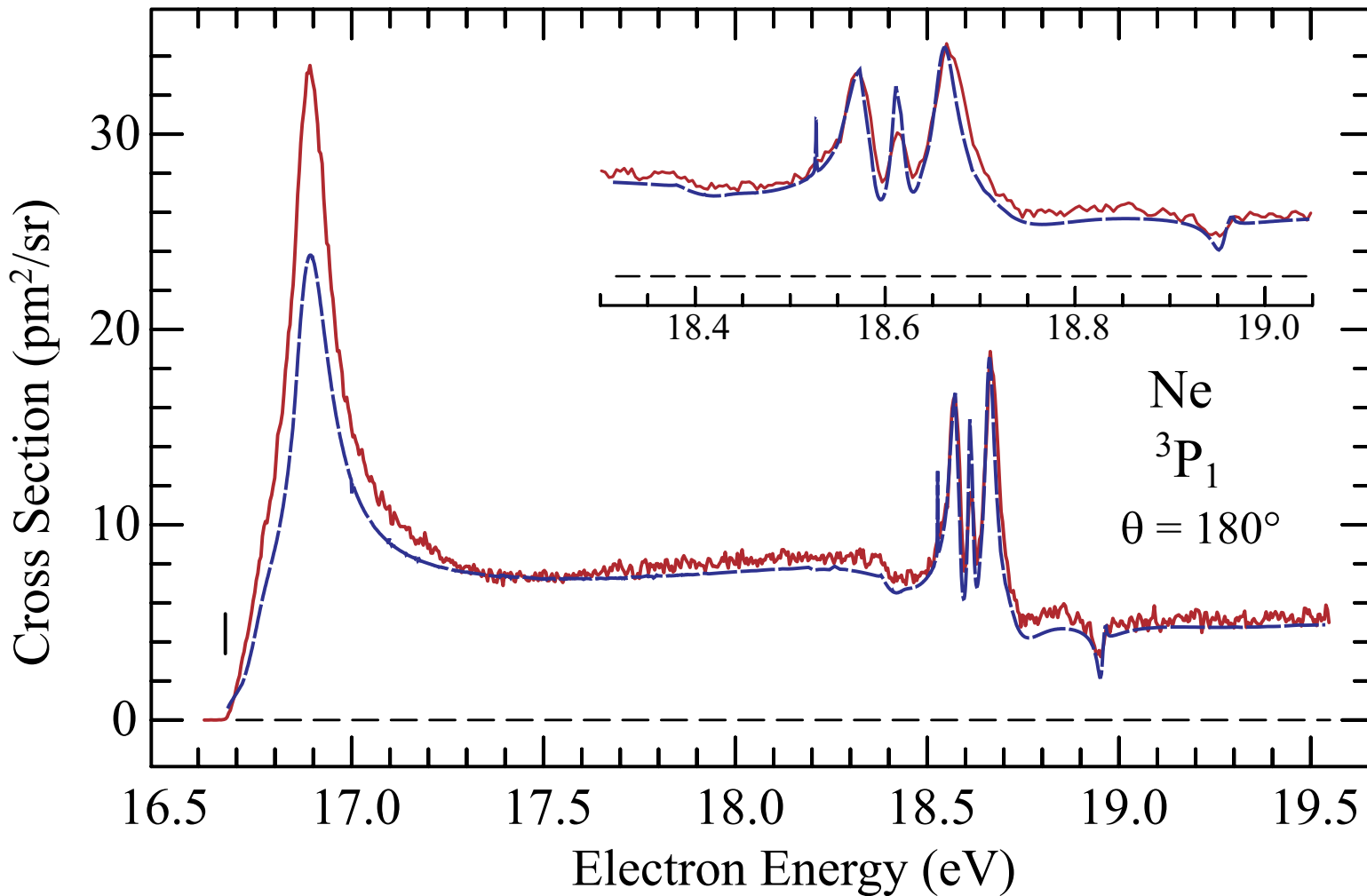


Elastic cross section in neopentane



Electronic excitation in neon, argon, xenon

↙ lecture of Klaus Bartschat



(with Kai Franz, Hartmut Hotop, Oleg Zatsarinny, Klaus Bartschat)

Conclusions

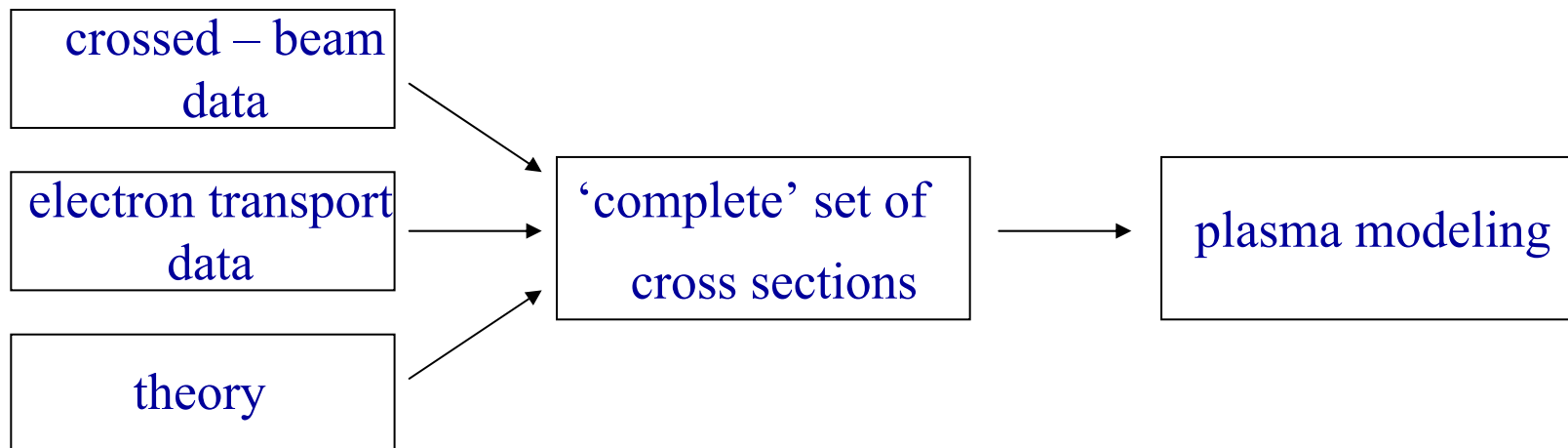
progress in measurement of e^- collision cross sections:

- consistency with results of other research groups
- low energy capacity
- large and small angles

Interesting phenomena at low energies and at large angles

Outlook

- absolute dissociative electron attachment cross sections



(→ Zoran Petrović)

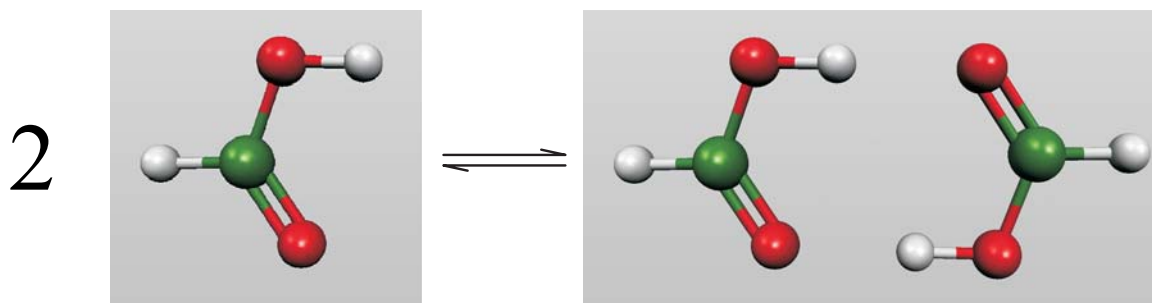
A wish

A set of state-of-the-art theoretical cross sections in helium as
standard (updating the 1979 data of Nesbet)

- elastic
- inelastic
- 0 – 30 eV, 0° – 180°, increment of 1°
- published numerically on the web

All groups in the field should use the same standard !

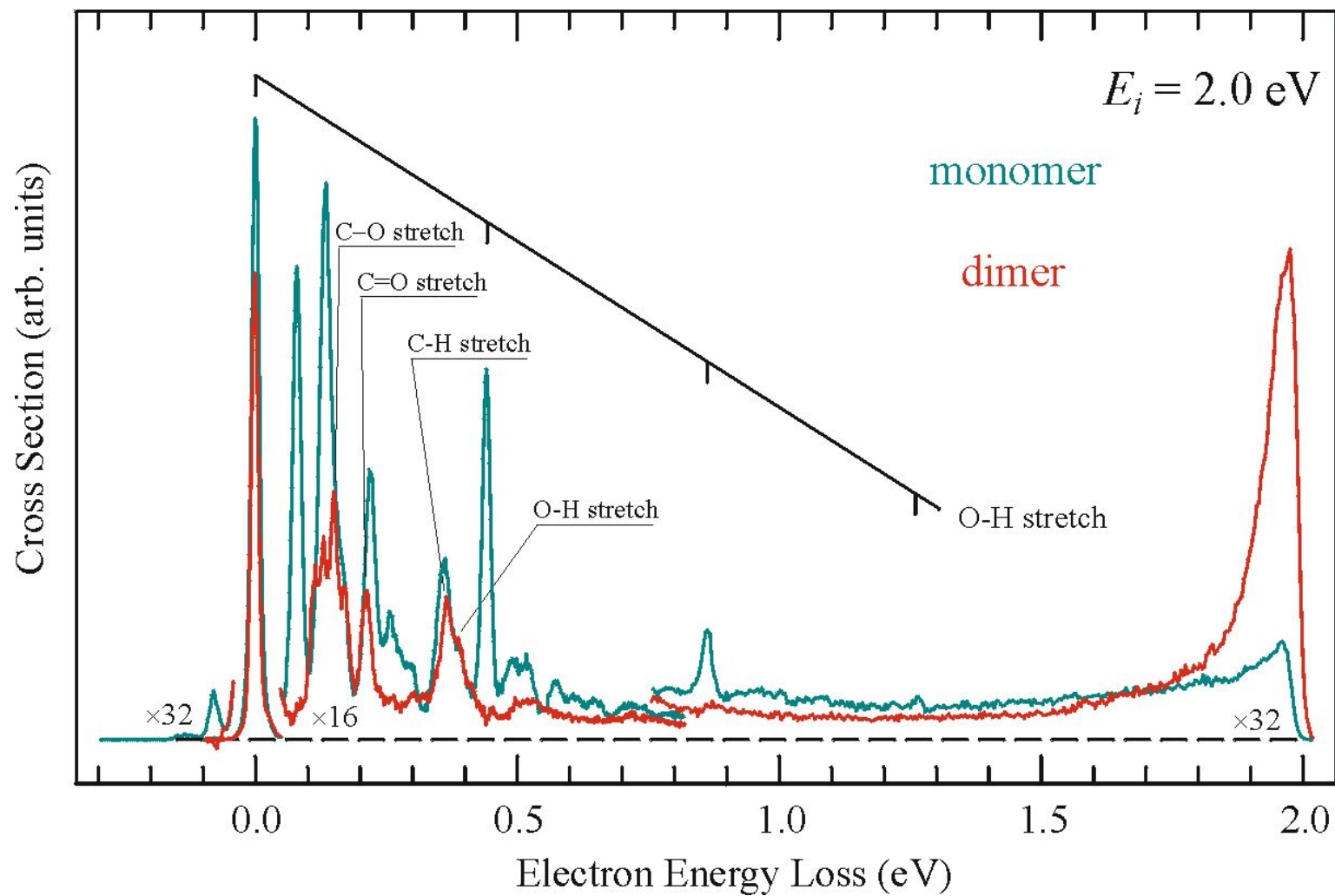
ELECTRON SCATTERING IN FORMIC ACID DIMER



$$\Delta H = -61.8 \text{ kJ/mol } (-0.64 \text{ eV})$$

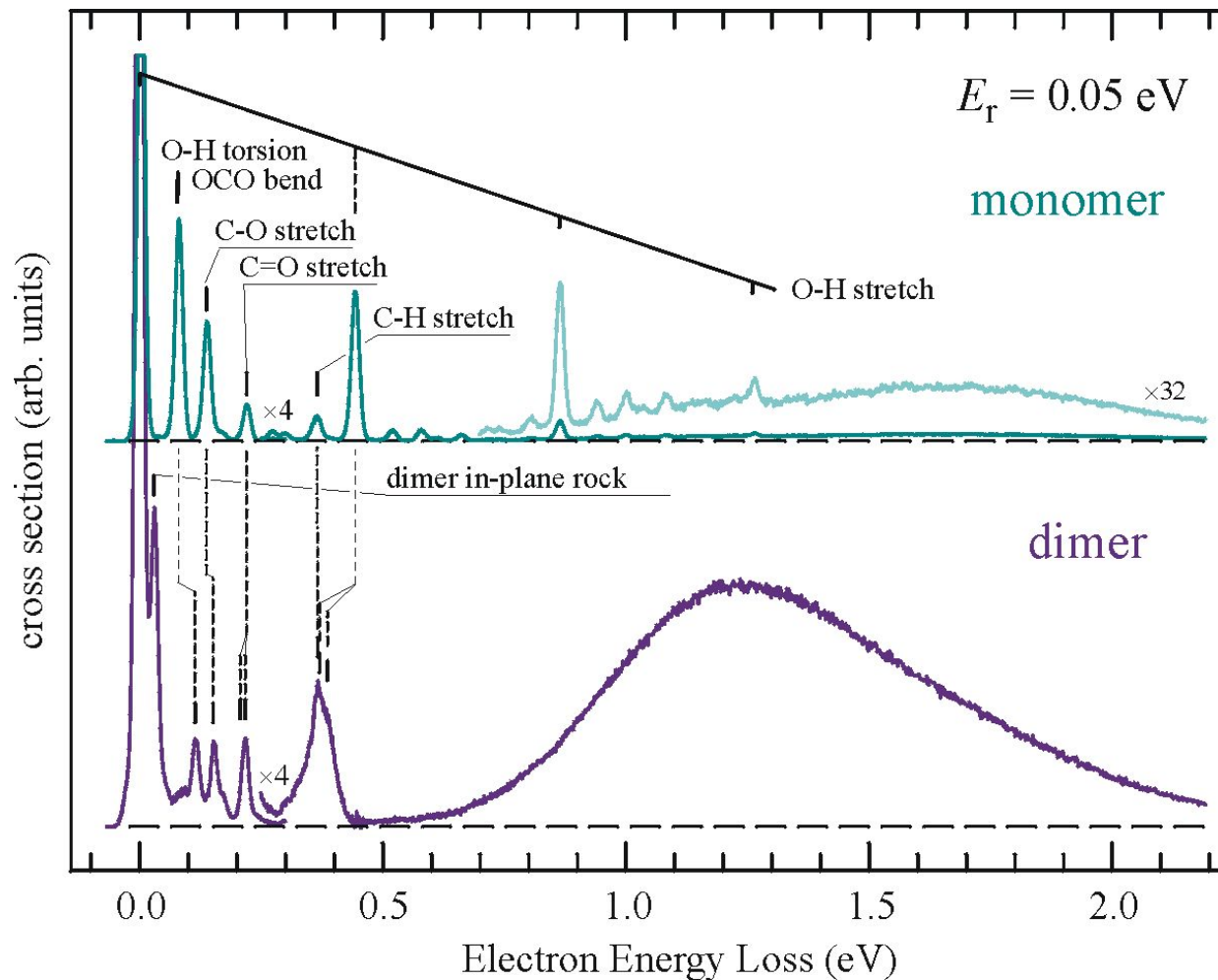
Do hydrogen bond have any ‘magic’ consequences on
electron – driven processes?

Distribution of electrons after impact of an 2 eV electron



The detached electrons peak at 0 eV

Excitation of a vibrational (*quasi*-) continuum



The 'uspecific' vibrational excitation is about 50× stronger in the dimer



Relaxation of the dimer upon electron attachment: proton transfer

Rafal A Bachorz, Maciej Haranczyk, Iwona Dabkowska, Janusz Rak and Maciej Gutowski

J. Chem. Phys. 2005



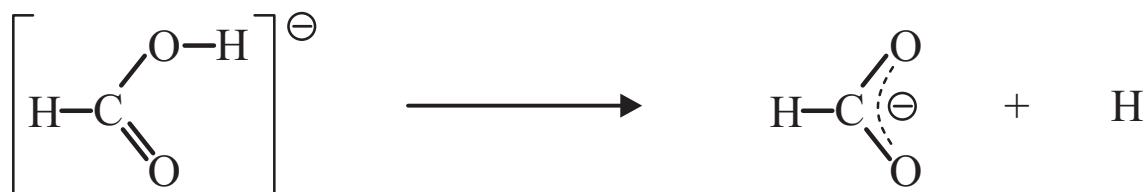
PRL 96, 213201 (2006)

PHYSICAL REVIEW LETTERS

week ending
2 JUNE 2006

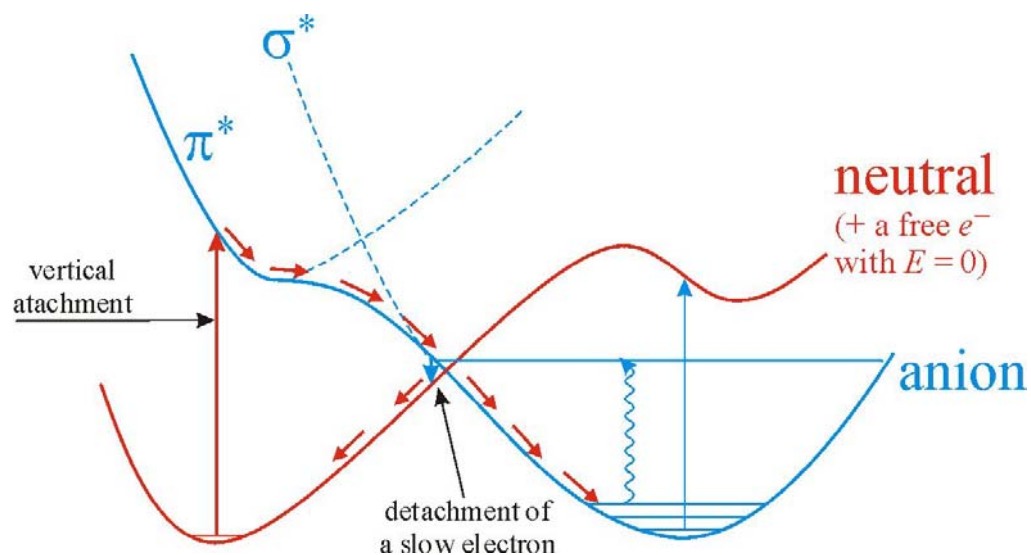
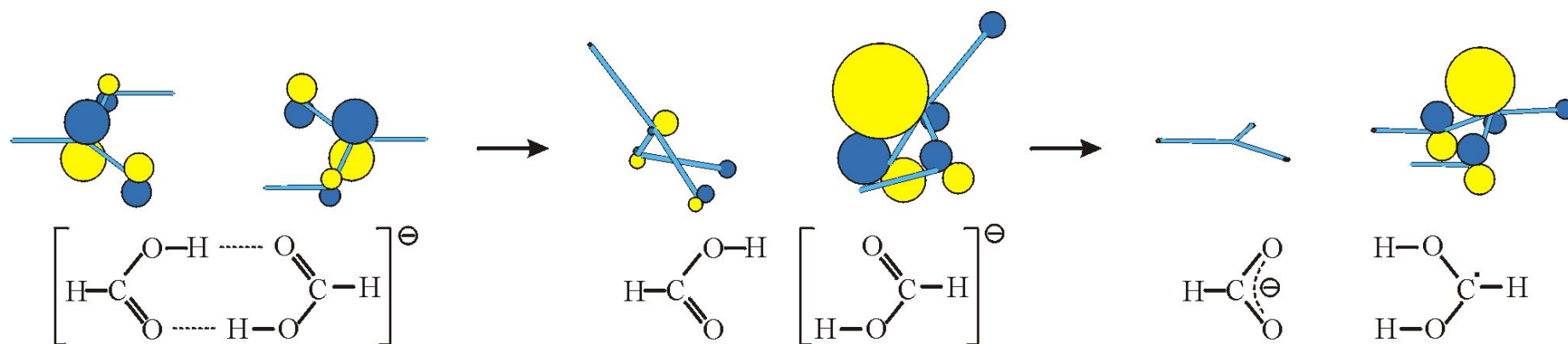
Dynamics of Low-Energy Electron Attachment to Formic Acid

T. N. Rescigno,¹ C. S. Trevisan,² and A. E. Orel²



Relaxation of the dimer upon electron attachment: proton transfer

schematic views of the singly occupied molecular orbital (SOMO)



CONCLUSION II

DO NOT FORGET CHEMISTRY!

chemistry could change your physics!



Rainer Dressler

Louis Neuhaus

Knut Asmis

Christophe Bulliard

Olivier Schafer

Anne-Christelle Sergenton

Duška Popović

Momir Stepanović

Tomáš Skalický

Svetlana Živanov

Bogdan Ibanescu

Olivier May

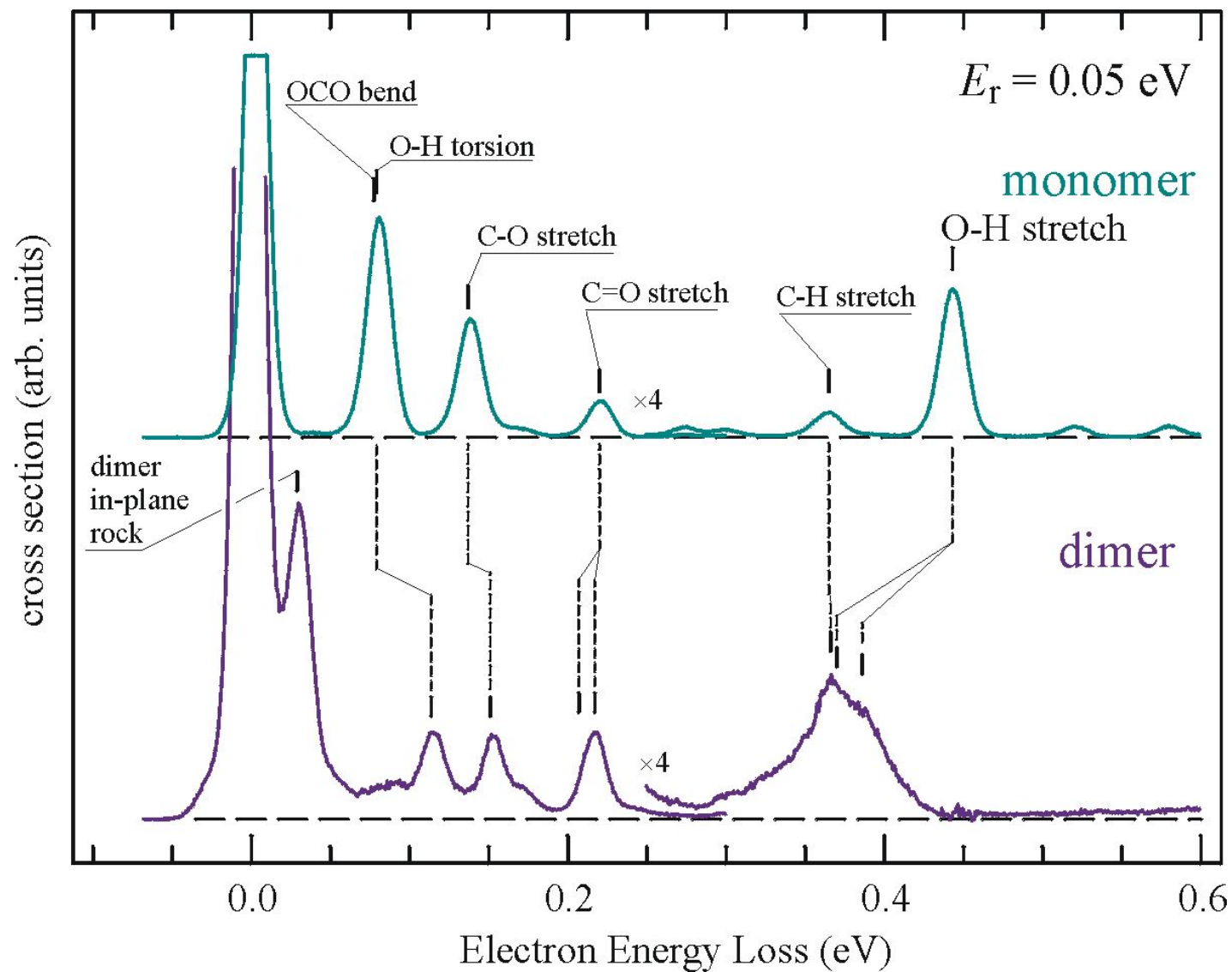
Juraj Fedor

Emil Brosi

Paul-Hervé Chassot

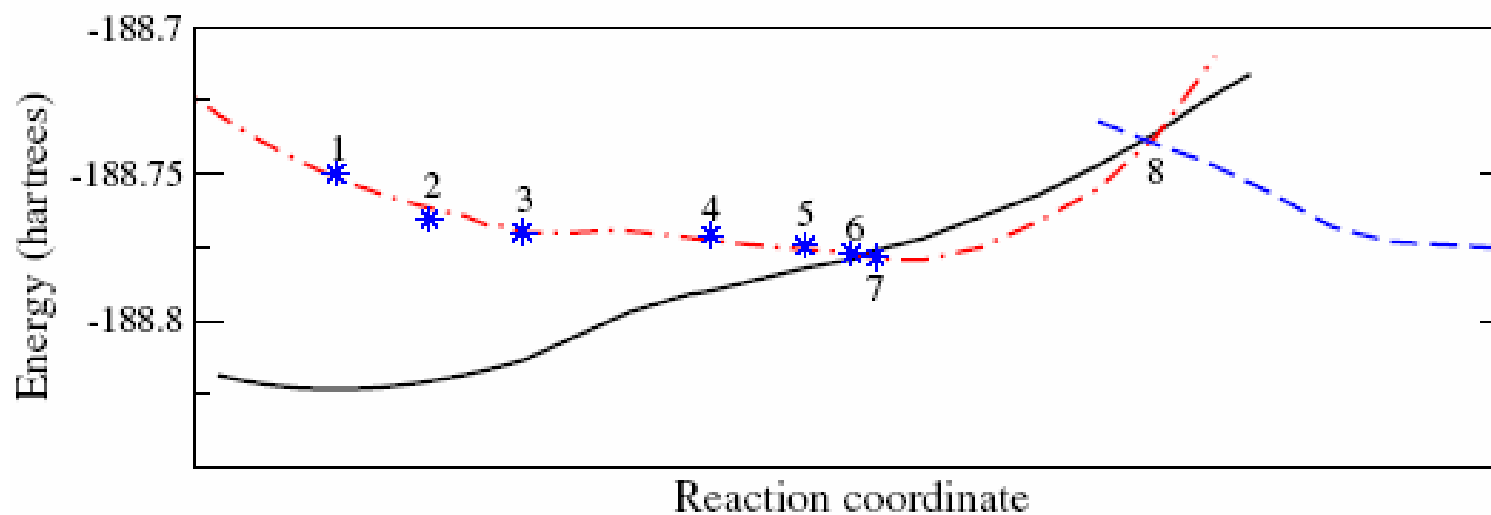
Olivier Graber

Electron energy – loss spectra at threshold (mostly IR active vibrations)



Dynamics of Low-Energy Electron Attachment to Formic Acid

T. N. Rescigno,¹ C. S. Trevisan,² and A. E. Orel²



potential curves for neutral target (solid curve), π^* anion (dash-dotted curve), and $2A'$ anion (dashed curve) along the reaction path.

Elastic cross section in CH₄

