



ICPEAC DEAUVILLE 2019



XXXI INTERNATIONAL CONFERENCE ON PHOTONIC, ELECTRONIC AND ATOMIC COLLISIONS

BOOK OF ABSTRACTS

JULY 23-30, 2019
DEAUVILLE, FRANCE

www.icpeac2019.fr





BOOK OF ABSTRACTS

SPECIAL REPORTS AND POSTERS

XXXI INTERNATIONAL CONFERENCE ON PHOTONIC,
ELECTRONIC, AND ATOMIC COLLISIONS

23 JULY – 30 JULY 2019, DEAUVILLE, FRANCE

*Edited by H. Bachau, R. Brédy,
O. Dulieu, E. Lamour, F. Penent,
C. Prigent, M. Trassinelli, D. Vernhet*

Integral cross sections for elastic electron scattering by methane molecule

J B Maljković^{1*}, J Vuković², K Tökési^{3,4}, B Predojević² and B P Marinković^{1†}

¹Institute of Physics Belgrade, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

²Faculty of Science, University of Banja Luka, Mladena Stojanovića 2, 78000 Banja Luka, Republic of Srpska, Bosnia and Herzegovina

³Institute for Nuclear Research, Hungarian Academy of Sciences (ATOMKI), Debrecen, Hungary

⁴ELI-ALPS, ELI-HU Non-profit Kft., Szeged, Hungary

Synopsis We have performed a combined experimental and theoretical study of electron elastic differential and integral cross sections from methane molecule (CH₄) in the intermediate energy range. Data have been compared with available data sets in the literature as well as with recommended data set [Song *et al J. Phys. Chem. Ref. Data* **44** 023101 (2015)].

Methane gas has been investigated widely in past years by electron collisions [1,2]. We measured electron elastic differential cross sections (DCSs) for methane molecule (CH₄) in the energy range from 50 eV to 300 eV and angular range from 20° to 130°. DCSs were then extrapolated to zero and 180° and integrated in order to obtain the integral cross sections. The experimental setup based on a crossed beam technique comprising of an electron gun, a single capillary gas needle and a detection system with a channeltron was used to measure differential cross sections.

The absolute scale for the cross sections is obtained by relative-flow method using argon gas as a reference [3]. For the interpretation of the measured data we applied the partial expansion method to calculate the elastic cross sections for electron scattering from methane.

Here we present our data point at 50 eV and we find it in an excellent agreement with the recommended set of data [1]. At the conference we will present our data points in a full scale of electron impact energies, from 50 to 300 eV in steps of 50 eV and calculated ICS curves obtained based on IAM method and screening correction factors.

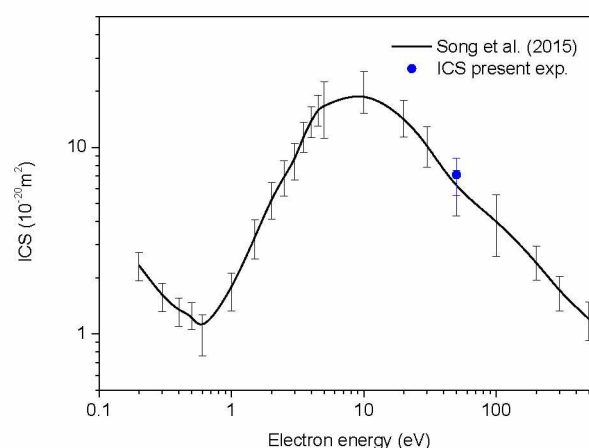


Figure 1. Energy dependence of integral cross sections for elastic electron scattering by methane molecule.

This work has been supported by the MESTD Grant #OI 171020. BPM acknowledges the grant of VAMDC consortium under Support Actions" Funding Scheme of The Seventh Framework Program. One of us KT was also supported by the National Research, Development and Innovation Office (NKFIH) Grant KH126886, and by the European COST Action CA15107 (MultiComp).

References

- [1] Song M-Y *et al* 2015 *J. Phys. Chem. Ref. Data* **44** 023101
- [2] Marinković B P *et al* 2019 *Atoms* **7** 11
- [3] Ranković M Lj *et al* 2018 *Eur. Phys. J D* **72** 30

* E-mail: jelena.maljkovic@ipb.ac.rs

† E-mail: bratislav.marinkovic@ipb.ac.rs

LOCAL ORGANIZING COMMITTEE

CHAIR

Dominique Vernhet (INSP - Paris)

CO-CHAIRS

Lamri Adoui (CIMAP - Caen)

Danielle Dowek (ISMO - Orsay)

Olivier Dulieu (LAC - Orsay)

Emily Lamour (INSP - Paris)



CELIA-Bordeaux

H. Bachau
V. Blanchet
F. Catoire
B. Fabre
B. Pons
A. Sopena

CIMAP-Caen

A. Domaracka
J. Douady
P. Rousseau

ILM-Lyon

C. Bordas
R. Brédy
F. Lépine

INSP-Paris

C. Prigent
S. Steydli
M. Trassinelli

IPCMS-Strasbourg

P.-A. Hervieux

IPN-Orsay

M. Chabot

LCPMR-Paris

T. Marchenko
F. Penet

LOMC- Le Havre

I. Schneider

LPCT-Metz

U. Ancarani

LPT-Toulouse

P. M. Dinh

PIIM-Marseille

S. Ferri

www.icpeac2019.fr

