

## プラズマ量子プロセス ユニットセミナー開催案内

日時：2023年6月16日（金）14：00－15：15

開催形式：ハイブリッド

場所：核融合科学研究所 研究I期棟5階セミナー室（501号室）

Zoom 会議室：

講演者：Ghanshyam Purohit (Mohanlal Sukhadia University, India)

講演題目：電子衝突電離で見る原子衝突のダイナミクス

講演要旨：添付ファイルをご覧ください



Date: Friday, June 16, 2023, 14:00-15:15

Format: Hybrid

Place: Seminar Room (Room 501), 5th floor, Research I Building, National Institute for Fusion Science

Zoom Conference Room:

Speaker: Dr. Ghanshyam Purohit (Mohanlal Sukhadia University, India)

Title: Probing collision dynamics of atoms, ions and molecules via electron impact ionization

Abstract: see attached file

# Probing collision dynamics of atoms, ions and molecules via electron impact ionization

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Ionization of targets such as atoms, ions, and molecules by charged projectiles such as electrons / positrons has been studied from a long time and has various applications; few may be listed as diagnostics of fusion plasmas, modeling of physics and chemistry related to atmosphere, understanding the effect of ionizing radiation on biological tissues etc. The detailed information about this kind of collision processes are obtained from cross sections. Particularly, the triple differential cross section (TDCS) obtained through the coincidence study has been of interest since the pioneering work of Ehrhardt group [1]. Coincidence study of TDCS has been of particular interest since it provides full information about the collision dynamics and momentum vectors of all the free particles involved in the ionization are determined.

Good amount of ionization cross section studies have been reported for the atomic targets [2]. From last decade the molecular targets have also been studied for the ionization processes [2, 3] as well as electron momentum spectroscopy studies [4]. We report the results of our recent work on calculation of electron impact ionization cross sections for atomic (Ar, Xe, W, Be) [5, 6], ionic (charged states of Be and W) [7] and molecular (N<sub>2</sub>, H<sub>2</sub>O and CO<sub>2</sub>) [8] targets. We will review briefly the status of charged particle ionization processes from targets with introductory idea about the theoretical formalism involved and results for the electron impact ionization of atomic / ionic / molecular targets will be discussed.

## References:

- [1] H. Ehrhardt, K. H. Hesselbacher, K. Jung, and K. Willmann, *J. Phys. B* 5, 1559 (1972).
- [2] D. H. Madison and O. Al-Hagan, *J. At. Mol. Opt. Phys.* 2010, 367180 (2010).
- [3] E. Ali, K. Nixon, A. J. Murray, C. G. Ning, J. Colgan and D. Madison, *Phys. Rev. A* 92, 042711 (2015).
- [4] N. Watanabe, S. Yamada and M. Takahashi, *Phys. Chem. Chem. Phys.* 20, 1063 (2018).
- [5] G. Purohit, D. Kato, I. Murakami and P. Sinha, *Eur. Phys. J. D* 75, 9 (2021).
- [6] G. Purohit, *J. Phys. B: At. Mol. Opt. Phys.* 54 065203 (2021)
- [7] G. Purohit, D. Kato, I. Murakami, Shivani Gupta and P. Sinha, *Eur. Phys. J. D* 75, 219

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[8] A. Pandey and G. Purohit, *Atoms* 10 (2), 50 (2022)