



Contributed Session

# Photoionization

10:30 am – 12:18 pm, Wednesday June 18 // Session F07 //

Oregon Convention Center, E141-142

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## Spectral features of photoionization of P I

11:18 am – 11:30 am

**Presenter:** Sultana Nurun Nahar (Ohio State Univ - Columbus)

Spectral features of photoionization of various fine structure levels of P I, ( $P\sim I + h\nu \rightarrow P\sim II + e$ ), will be reported. These include characteristic features of Rydberg and Seaton resonances, effects of fine structure couplings, equivalent electron levels, low and high lying excited levels, and their impact on the background cross sections. The present calculations were carried out in the relativistic Breit-Pauli R-matrix (BPRM) method with close-coupling (CC) approximation that generates the resonances inherently. The CC wavefunction expansion for P I includes ground and 27 excited levels of the core ion  $P\sim II$  with orbitals in  $n=3,4$  complexes and 87 configurations of  $P\sim I$  for bound channel contributions. Photoionization cross sections ( $\sigma_{PI}$ ) with detailed resonances are presented for all 543 fine structure levels of P I found with  $1/2 \leq J \leq 15/2$  even and odd parity and  $n \leq 10$  and  $l \leq 9$ . The autoionizing resonances are delineated with a fine energy mesh to observe the fine structure effects. The ground level shows typical feature of smoothly decreasing  $\sigma_{PI}$  with increasing energy. However, a compressed set of narrow resonances formed by the coupling of channels in fine structure is found to exist at the ionization threshold of photoionization for the ground and many excited levels. These resonances and strong Rydberg resonances in the low energy

region are observed in photoionization spectra of the five equivalent electron levels of P I. Low lying excited levels show presence of strong Rydberg resonances and many with enhanced background cross section. Prominent Seaton resonances due to photo-excitation-of-core (PEC), often with enhanced background, are seen in photoionization of single valence electron high lying excited levels. The present results should provide high accuracy parameters of various model applications, such as, for exoplanetary atmosphere spectroscopy.

## PRESENTATIONS (9)

Filter presentations



### 10:30 am – 10:42 am

#### Photoionization Cross-Sections of Molecular Species: Computational Methods and Comparison

Aaron Forde (presenter)

### 10:42 am – 10:54 am

#### Intramolecular particle exchange in the fragmentation of methanol upon valence photo double ionization

Sarvesh Kumar (presenter), Moniruzzaman Shaikh, Wael Iskandar, Richard Thurston, Muhammad Ashiq Fareed, Demitri Call, Ryan Enoki, Chandan Bagdia, Naoki Iwamoto, Travis Severt, Joshua D Williams, Robert Ross Lucchese, Daniel S Slaughter, Thorsten Weber, Itzik B Itzhak

### 10:54 am – 11:06 am

#### Dramatic Effects of Relaxation on Many-Body Interactions: Atomic Photoionization of Outer Shells in the Vicinity of Inner-Shell Thresholds

Steven T Manson (presenter), Rahul Silva, C. Rasadi Munasinghe, Pranawachandra Chakradhar Deshmukh, Abhishek Verma, Dawei Peng, Iyas Ismail, Tatiana Marchenko, Oksana Travnikova, Renaud Guillemin, Nicolas Velasquez, Maria Novella Piancastelli, John Bozek, Marc Simon, Ralph Püttner

### 11:06 am – 11:18 am

#### Measurement of ionization threshold by electric field-dependent Rydberg state spectroscopy of Rb<sub>2</sub> molecule

Luis Gustavo Marcassa (presenter), Manuel A. A Lefran Torres, David Rodriguez Fernandez, Jaime J Borges Márquez, Marcos R Cardoso, Amrendra Pandey, Romain Vexiau, Olivier Dulieu, Nadia Bouloufa

### 11:18 am – 11:30 am

#### Spectral features of photoionization of P I

Sultana Nurun Nahar (presenter)

**11:30 am – 11:42 am**

On the lifetime of  $2p^2\ ^3P$  state of  $H^-$

Aldo A Martínez Calderón (presenter), Guillermo Hinojosa

**11:42 am – 11:54 am**

The Discovery and Confirmation of Negative Methane.

Guillermo Hinojosa (presenter), Alejandro Ramirez-Solís, Humberto Saint-Martín, Jacques Vigué

**11:54 am – 12:06 pm**

Electrode Surrounding scattering effect on efficiency of proton exchange membrane fuel cell

Saddam H Dhobi (presenter), Kishori Yadav, Suresh P Gupta, Jeevan J Nakarmi, Ajay J Jha

**12:06 pm – 12:18 pm**

A Gauss-Radau-Laguerre discrete variable representation for use in continuum electron dynamics

Frank L Yip (presenter), Tyler Venator, Robert Luccese, C. William McCurdy

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