

Towards the Threshold Photodetachment Spectroscopic studies of C²⁻ and C₂H⁻

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Different neutral and charged interstellar molecules constitute the building blocks for a rich reaction network in the interstellar medium (ISM). Many complex molecules have been detected but many observed spectra still have unidentified features. The abundance of negative ions in the ISM and their role in the chemistry of these environments has been subject to long-standing discussions in astrochemistry. Photodetachment cross-section studies are crucial for predicting the abundance of anions in the ISM.

Absolute photodetachment cross-section studies of hydrocarbon anions C_nH⁻, n = 2, 4, 6 above the detachment threshold were performed in 2011 [1]. The threshold photodetachment spectroscopy of CN⁻ was performed by our group at both 16 K and 295 K in a 22-pole ion trap and 295 K from a pulsed ion beam using crossed-beam velocity map imaging (VMI) setup [2]. In next experiments we aim to study the threshold photodetachment spectroscopy of C²⁻ and C₂H⁻, which are speculated to exist in the interstellar medium, in a 16-pole radiofrequency ion trap, which can be cooled down to 6 K to mimic conditions in the ISM. The status of the experiment will be presented.

Reference

1. Best, T., Otto, R., Trippel, S., Hlavenka, P., Von Zastrow, A., Eisenbach, S., Jezouin, S., Wester, R., Vigren, E., Hamberg, M. and Geppert, W.D., 2011. Absolute photodetachment cross-section measurements for hydrocarbon chain anions. *The Astrophysical Journal*, 742(2), p.63.
2. Simpson, M., Nötzold, M., Schmidt-May, A., Michaelsen, T., Bastian, B., Meyer, J., Wild, R., Gianturco, F.A., Milovanović, M., Kokoouline, V. and Wester, R., 2020. Threshold photodetachment spectroscopy of the astrochemical anion CN⁻. *The Journal of Chemical Physics*, 153(18), p.184309.

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