Infrared spectroscopy of astrophysically relevant hydrocarbons

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LIST OF PUBLICATIONS

1. *Electronic spectra of C_3 from the ground state bending mode*
   Q. Zhang, **K. D. Doney**, J. Gu, D. Zhao, H. Linnartz, and Y. Chen, in preparation

2. *Stretching our understanding of C_3: Experimental and theoretical spectroscopy of highly excited $n\nu_1 + m\nu_3$ states ($n \leqslant 7$ and $m \leqslant 3$)*
   B. Schröder, **K. D. Doney**, P. Sebald, D. Zhao, and H. Linnartz, submitted

3. *High-resolution infrared spectra of the ν_1 fundamental bands of monosubstitued ^{13}C propyne isotopologues*
   K. D. Doney, D. Zhao, and H. Linnartz, The Journal of Physical Chemistry A, 122 (2018) 582

4. *Theoretical investigation of the infrared spectrum of small polyynes*
   K. D. Doney, D. Zhao, J. F. Stanton, and H. Linnartz, Physical Chemistry Chemical Physics, 20 (2018) 5501

5. *The high-resolution infrared spectrum of the ν_3+ ν_5 combination band of jet-cooled propyne*
   K. D. Doney, D. Zhao, J. Bouwman, and H. Linnartz, Chemical Physics Letters, 684 (2017) 351

6. *Deuterated polycyclic aromatic hydrocarbons: Revisited*
   K. D. Doney, A. Candian, T. Mori, T. Onaka, and A. G. G. M. Tielens, Astronomy & Astrophysics, 586 (2016) A65

7. *High-resolution infrared spectrum of triacetylene: The ν_5 state revisited and new vibrational states*
   K. D. Doney, D. Zhao, and H. Linnartz, Journal of Molecular Spectroscopy, 316 (2015) 54

8. *Laboratory gas-phase detection of the cyclopropenyl cation (c-$C_3H_3^+$)*
   D. Zhao, **K. D. Doney**, and H. Linnartz, The Astrophysical Journal Letters, 791 (2014) L28

9. *High-resolution infrared spectra of vibrationally excited HC_4H in a supersonic hydrocarbon plasma jet*
   D. Zhao, **K. D. Doney**, and H. Linnartz, Journal of Molecular Spectroscopy, 296 (2014) 1

CURRICULUM VITAE

I was born in Dallas, Texas in 1988, and spent most of my formative years in Austin, Texas. My undergraduate degree started at Texas A&M University (for one year), and was completed at The University of Texas at Austin, from which I obtained a B.Sc. in Chemistry and a B.A. in Astronomy in December 2011. For undergraduate research experience, I worked on a project to model the young stellar object IRAS 03245+3002 under the supervision of Hyo Jeong Kim and Dr. Neal J. Evans II. During my bachelor's degree, I switched from majoring in biochemistry to pure chemistry and astronomy, which required multiple labs in biology, chemistry, and physics, and cemented an interest in being an experimentalist. This interest was furthered through 1) work in the chemical stockroom during undergrad making and suppling chemicals for the teaching labs, and 2) work as a teaching assistant for general chemistry teaching labs after graduating.

In 2012, I began my graduate career at the University of Leiden. My master's study was financially supported in the first year by the Silver Leiden University Excellence Scholarship (LExS), and in the second year by the van de Hulst fellowship. In 2014, I obtained a M.Sc. in Astronomy; with a minor project studying the high-resolution infrared spectrum of diacetylene at 3 μm under the supervision of Dr. Dongfeng Zhao and Prof.dr. Harold Linnartz, and a major project searching for deuterated PAH infrared features in observational spectra of HII regions of the Milky Way and Magellanic Clouds under the supervision of Dr. Alessandra Candian and Prof.dr. A. G. G. M. Tielens. Immediately following the completion of my masters degree I began my doctoral degree, and on the work described in this thesis. The Ph.D. was promoted by Prof.dr. Harold Linnartz and Dr. Dongfeng Zhao as part of the Sackler Laboratory for Astrophysics. During the course of my doctoral career, I presented the work in this thesis at various conferences and workshops in the Netherlands, the United States, England, France, Finland, and China, the attendance of which were partially supported by my three Leids Kerkhoven-Bosscha Fonds (LKBF) grants, one Leids Universiteits Fonds (LUF) grant, and one University of Science and Technology of China fellowship B grant.

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