



Electron Driven Chemistry in the Interstellar Medium

A PhD studentship is available joint between the groups of Cate Anstöter and Ewen Campbell, School of Chemistry, University of Edinburgh, see <https://isla-edi.com/>

The studentship is fully funded for 42 months by the University of Edinburgh and covers tuition fees and an annual stipend (starting at £19,273 per annum) for a candidate satisfying EPSRC residency criteria. <https://www.ukri.org/councils/esrc/career-and-skills-development/funding-for-postgraduate-training/eligibility-for-studentship-funding/#contents-list>

Project Summary

The project will combine computational chemistry and gas-phase spectroscopy to probe electron driven chemistry of astrochemically relevant species in the interstellar medium (ISM). Polycyclic aromatic hydrocarbons (PAHs) are purported to be the largest charge carrier in the ISM, here we propose to use computational chemistry to model the intrinsic electronic structure and dynamics alongside spectroscopy. Historically research has hinged around an understanding of neutrals and cations in the ISM, despite the prevalence of free electrons and the redox chemistry that is proposed to drive the formation of molecules. Here we propose to probe electron attachment and detachment to hetero-PAHs, developing new computational protocols and benchmarking against electronic and vibrational spectra. The synergy between theory and experiment allows an unambiguous understanding of the fundamental chemistry, critical to answering several questions of societal interest.

In the first instance, the initial application (including cover letter and CV) should be directed to: Cate Anstöter, School of Chemistry, University of Edinburgh, David Brewster Road, Edinburgh EH9 3FJ, UK. Email: Cate.anstoter@ed.ac.uk

The position will remain open until 30 August 2024.

References

- 1) J. N. Bull, P. Bolognesi, C. S. Anstöter, E. K. Ashworth, J. E. Navarro Navarrete, B. Zhu, R. Richter, N. Pal, J. Chiarinelli, L. Avaldi, H. Zettergren, M. H. Stockett
[Autoionization from the plasmon resonance in isolated 1-cyanonaphthalene](#)
J. Chem. Phys., 2023, 158, 241101
- 2) F. C. Daly, J. Palotás, U. Jacovella and E. K. Campbell
[Electronic spectroscopy of 1-cyanonaphthalene cation for astrochemical consideration](#)
A&A, 2023, 677, A128
- 3) C. Sagan, C. S. Anstöter, M. Thodika, K. D. Wilson, S. Matsika and E. Garand
[Spectroscopy and Theoretical Modeling of Tetracene Anion Resonances](#)
J. Phys. Chem. Letts. 2022, 13, 10245

IMPORTANT

Before Submitting your cover letter and CV, please complete the online [School of Chemistry Equality, Diversity and Inclusion Form 2024](#).

The form will automatically generate a unique “Receipt Number” that you MUST include in your cover letter.

Equality and Diversity

The School of Chemistry holds a Silver Athena SWAN award in recognition of our commitment to advance gender equality in higher education. The University is a member of the Race Equality Charter and is a Stonewall Scotland Diversity Champion, actively promoting LGBT equality. The University has a range of initiatives to support a family friendly working environment. See our University Initiatives website for further information. University Initiatives website: <https://www.ed.ac.uk/equality-diversity/help-advice/family-friendly>