

## An All In One Ion Source

PhD Advert

London Centre for Nanotechnology (LCN), University College London

### Project Description

**Why is this research important?** The goal of this project is to perform fundamental studies on Ionic Liquid Ion Sources (ILIS), a new technology which can be used in micro and nano fabrication.

Ionic liquids are mixtures of cations or anions that are liquid at room temperature with no intervening solvent. The cations are usually large organic molecules, while the anions may be complex organic or simple inorganic ions. In ILIS, a needle emitter is covered with ionic liquid and biased to a high voltage with respect to a downstream metallic extractor to trigger evaporation of ions from the liquid. The resulting beam can be used to treat materials.

ILIS are capable of producing many types of ions, ranging from halogens to kilodalton organic species, which could be tailored for a range of applications. ILIS have already been used to etch (remove) silicon, a key material in microelectronics. ILIS could be used as a new alternative in industrial processes including etching and focused ion beams.

**Who will you be working with?** With Dr Carla Perez-Martinez in the London Centre for Nanotechnology

Supervisor Profile: <https://profiles.ucl.ac.uk/74995-carla-perez-martinez>

Group Website: <https://www.ucl.ac.uk/london-nano/fabrication-ionic-liquid-ion-sources>

**What will you be doing?** This experimental project will involve fundamental characterization of multi-liquid ILIS, this is, ion sources where several ionic liquids are combined in a bid to produce a greater variety of ions from one cartridge. The student will be trained in our bespoke time-of-flight and retarding potential analyzer instruments in the LCN. Furthermore, the student will characterize the dependence of the beam angular and energy characteristics on the ion source operating parameters.

**Who are we looking for?** Suitable candidates will have a minimum of an upper second-class UK Master's degree in physics, electrical or electronic engineering, materials science, or a related discipline, or an equivalent overseas qualification.

The supervisor, Dr Carla Perez-Martinez, cares deeply about her students' wellbeing and professional development and hopes that you may consider applying for this project – see next page for funding details!

## Funding Details

This project can be funded from the following scholarships: [UCL-China Scholarship Council](#), [UCL-Research Excellence Scholarship](#) or [UCL-Research Opportunity Scholarship](#).

Please note the deadline for the Research Excellence Scholarship and Research Opportunities Scholarships is 10 January 2025 and for UCL CSC is 15 January 2025.

**Please contact Dr Perez Martinez ASAP if you are interested in a project and wish to apply for any of these funding options.**