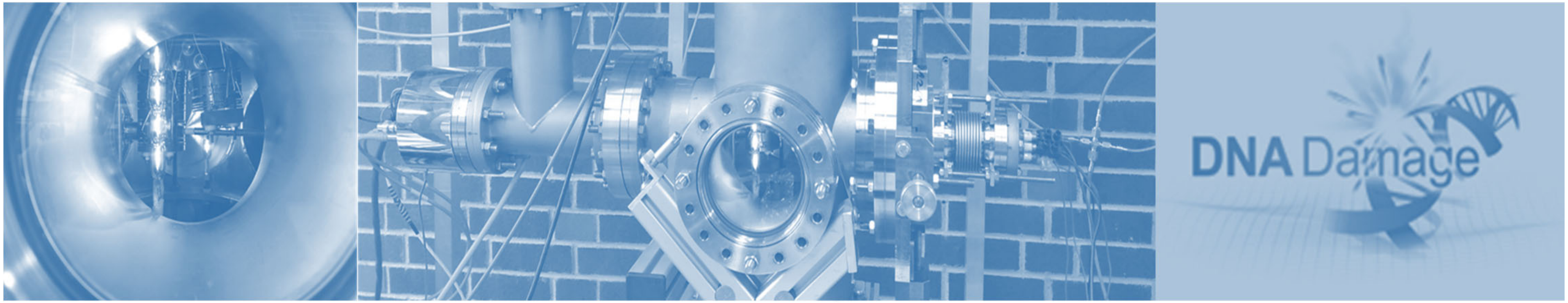
Institut für Ionenphysik und Angewandte Physik

Inelastic Electron Scattering – WG Denifl



Stephan Denifl

About the Inelastic Electron Scattering Group

The Group

- 2 PhD Students and 2 student co-workers.

Research fields

Single molecule studies

- Low-energy electron (E_{kin}<100 eV) interaction with biomolecules, radiosensitisers and polymeric compounds

Clusters

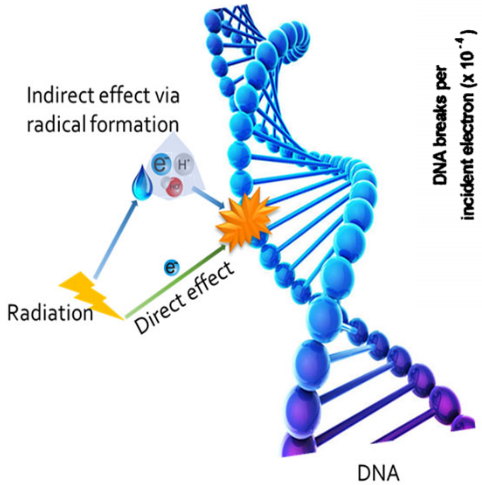
- Electron collisions with (heterogeneous) molecular clusters

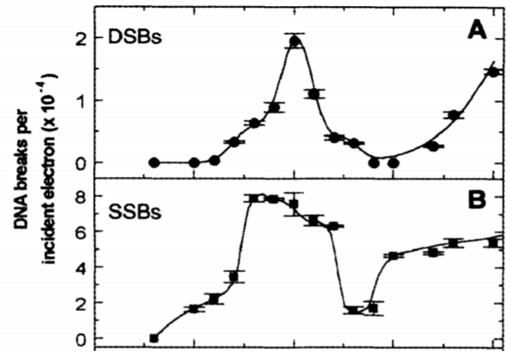
Applications

- Radiation chemistry, astrochemistry, material sciences

Motivation

Chemical effect of radiation and low-energy electrons

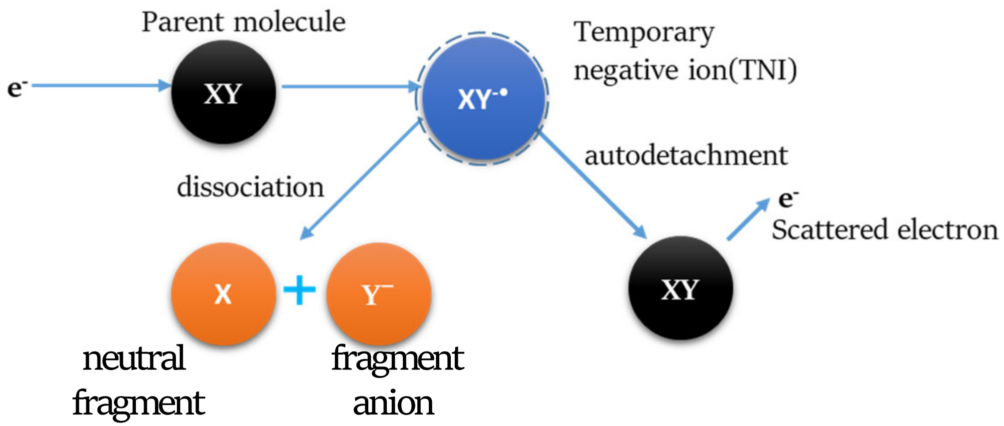




B. Boudaïffa et al., (2000).

SSB – Single Strand Break
DSB – Double Strand Break

Electron Collisions



$e^- + XY \rightarrow XY^{-*} \rightarrow X + Y^-$ dissociative electron attachment

$e^- + XY \rightarrow XY^{n+} + (n+1)e^-$ (multiple) ionisation

$e^- + XY \rightarrow X^+ + Y + 2e^-$ dissociative ionisation

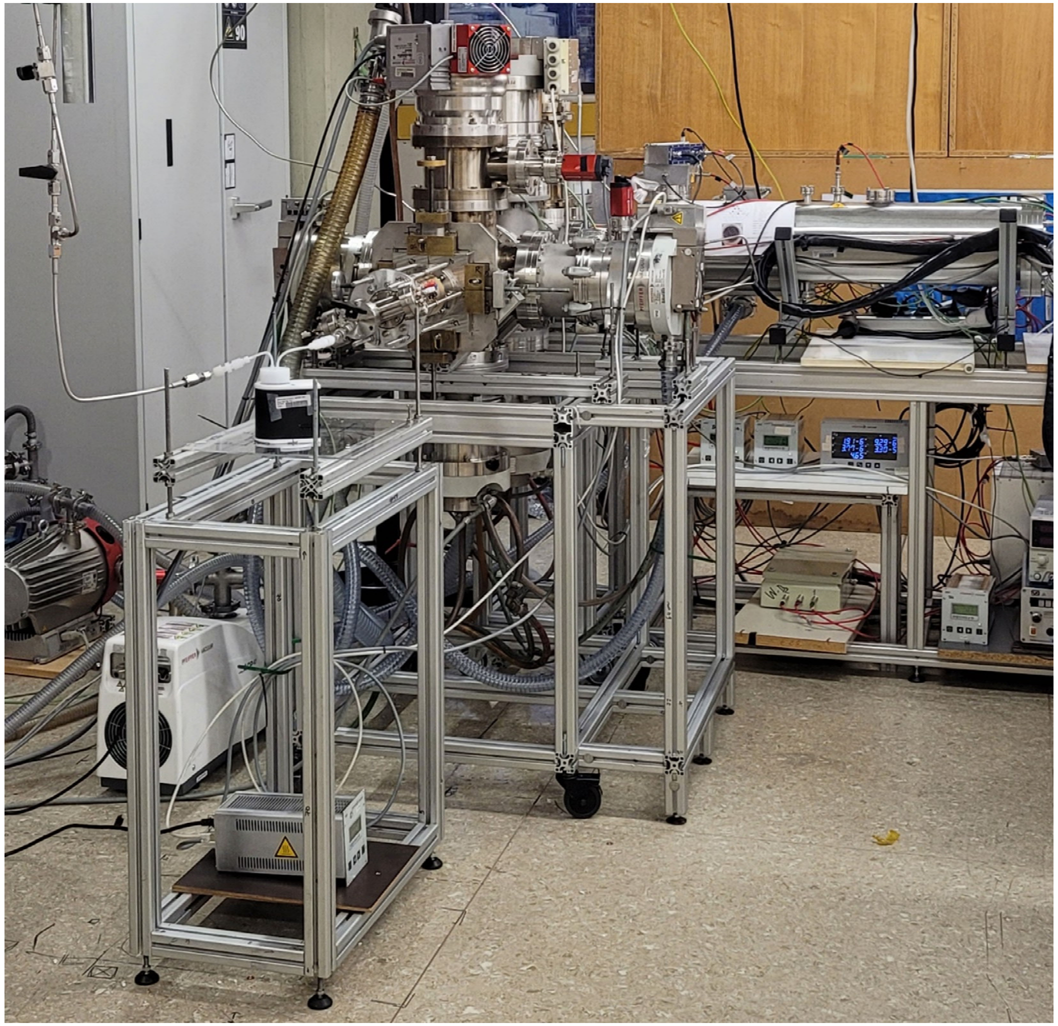
$e^- + XY \rightarrow X^+ + Y^- + e^-$ ion pair formation

Results in bond cleavages:
Single bond, double bond or complex decompositions into multiple fragments

Experimental Setup

Crossed electron-molecular beam setups

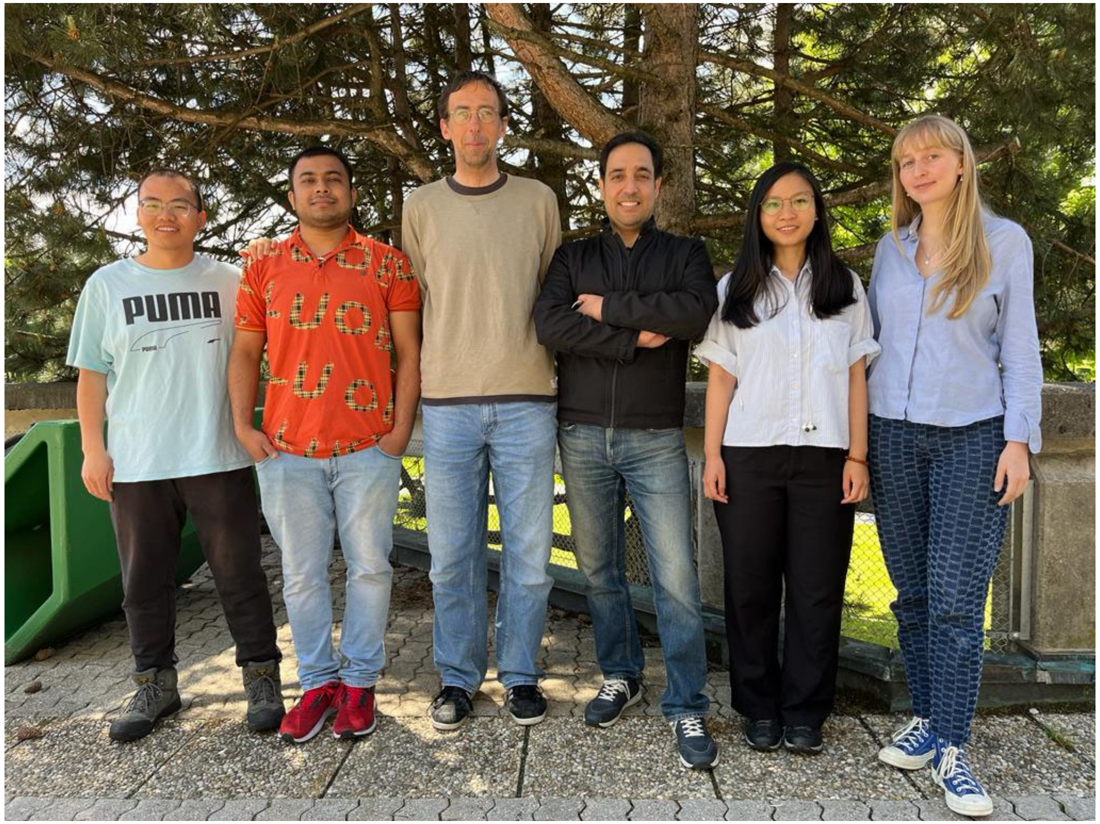
Reflectron time-of-flight mass spectrometer and quadrupole mass spectrometer



Possible topics in this year

- Electron collisions with hydrated clusters of biologically relevant molecules, e.g. genistein (Bachelor topic with lab time in February or March)
- Electron collisions with single molecules of biological relevance, e.g. triazole derivatives (Bachelor topic already reserved, possible topic for Master study from summer on)
- Other topics upon agreement

Acknowledgement



Thank you for your attention! For further information, please contact: Stephan.Denifl@uibk.ac.at