

Auger spectroscopy of Fulminic acid, HCNO

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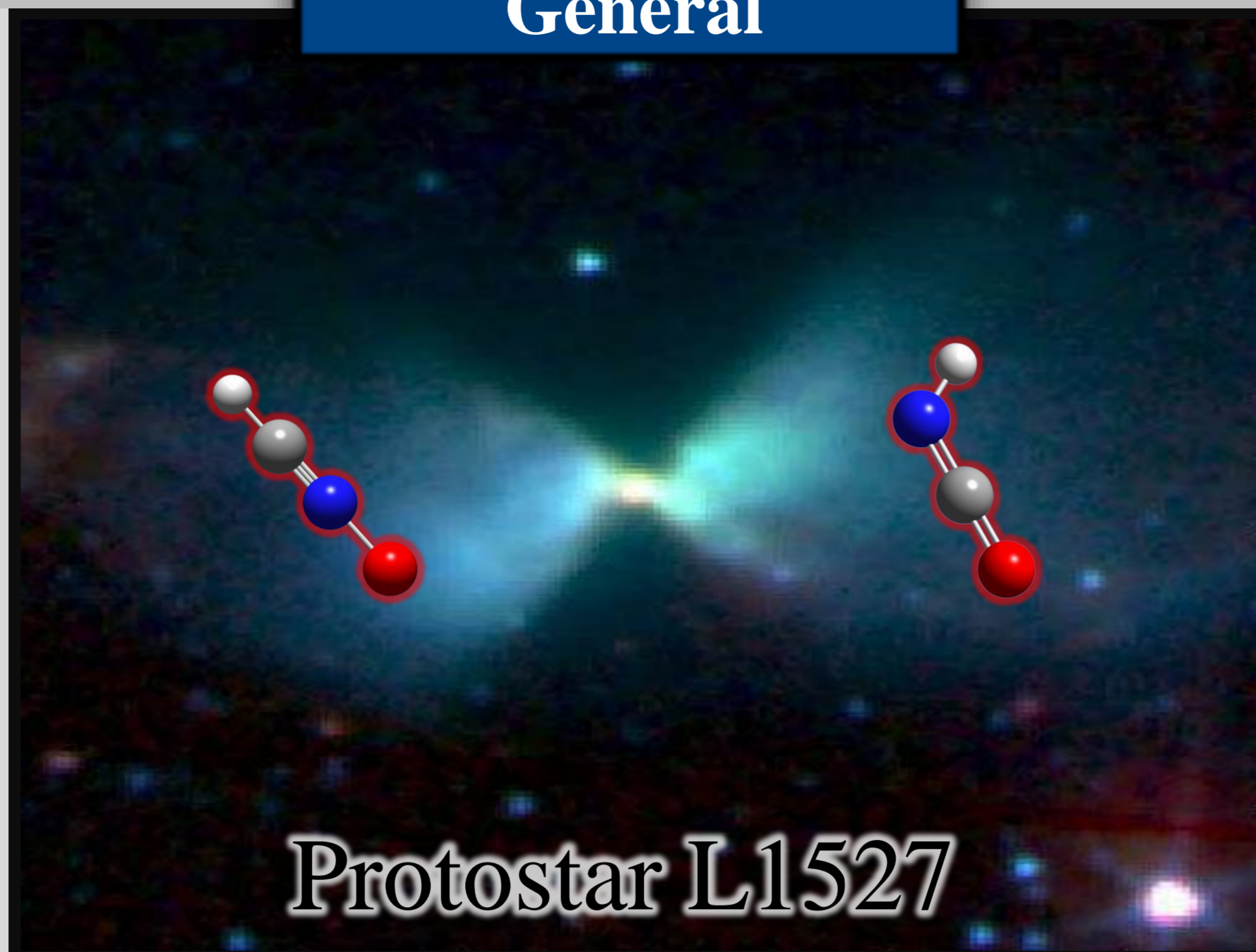
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General



Motivation

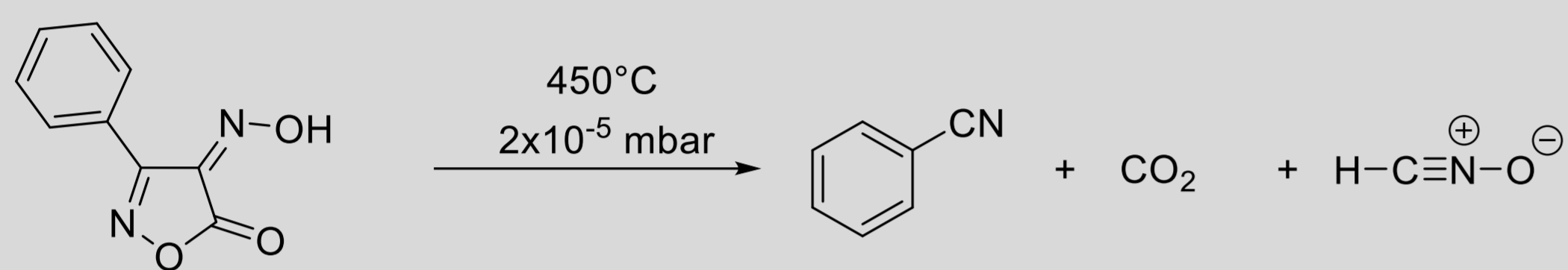
- HCNO has been observed numerous times in the interstellar medium.
- Alongside with Isocyanic acid, HNCO, a prebiotic role has been suggested for these molecules
- Our group already investigated the auger spectra and subsequent fragmentation products of Isocyanic acid

Goals

- Investigate the non-resonant and resonant auger process initiated by soft x-ray radiation.
- Compare the spectra to those of isocyanic acid
- Conduct quantum chemical calculations to produce simulations in order to further elucidate the nature of the observed transitions

Experimental details

Synthesis of HCNO



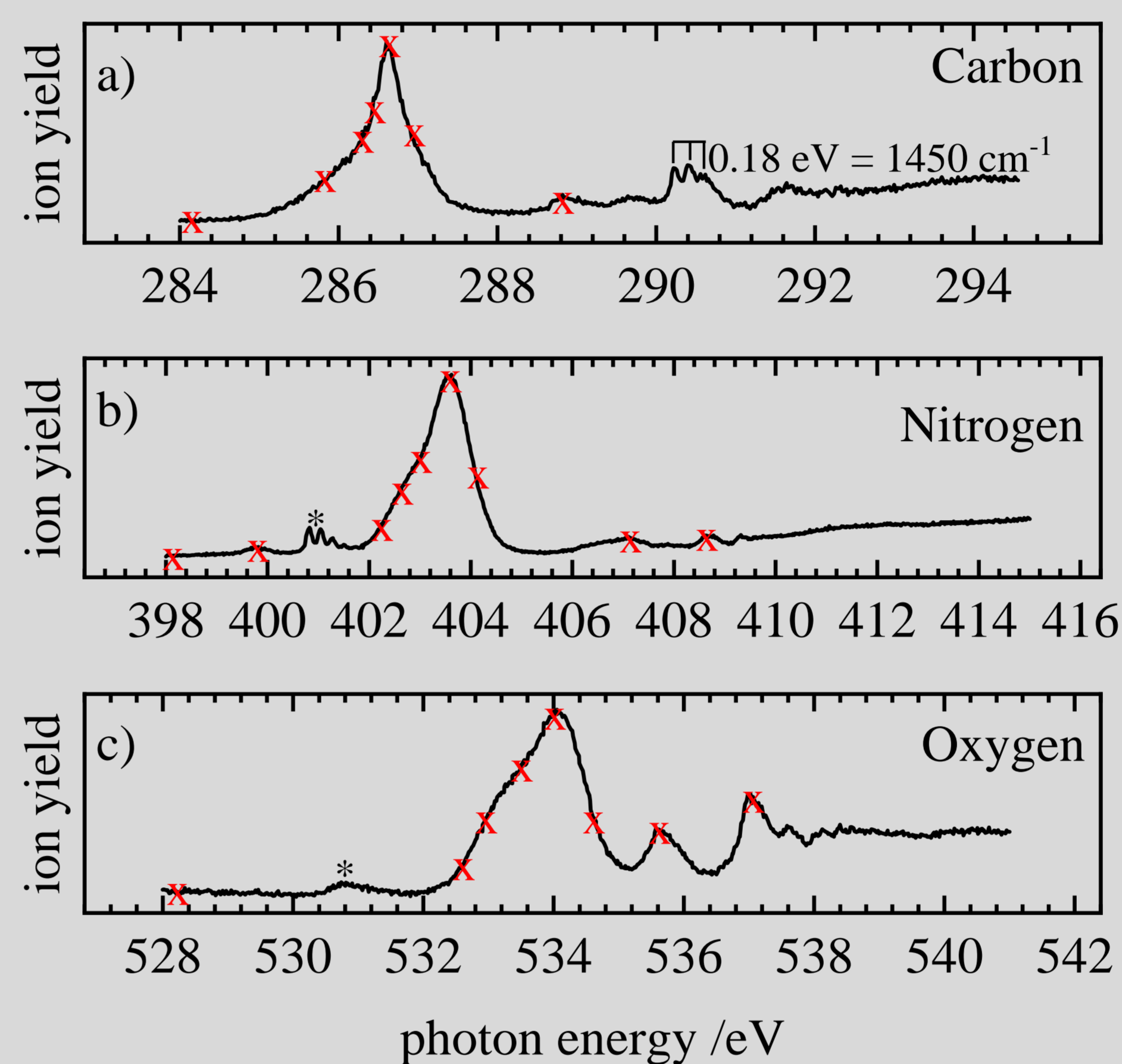
PLEIADES Beamline

- 5 – 500 eV light produced by Apple II HU80 Undulator
- Electrons were detected using a SCIENTA VG 4000 hemispherical analyser. Spectral resolution: 37.5 meV

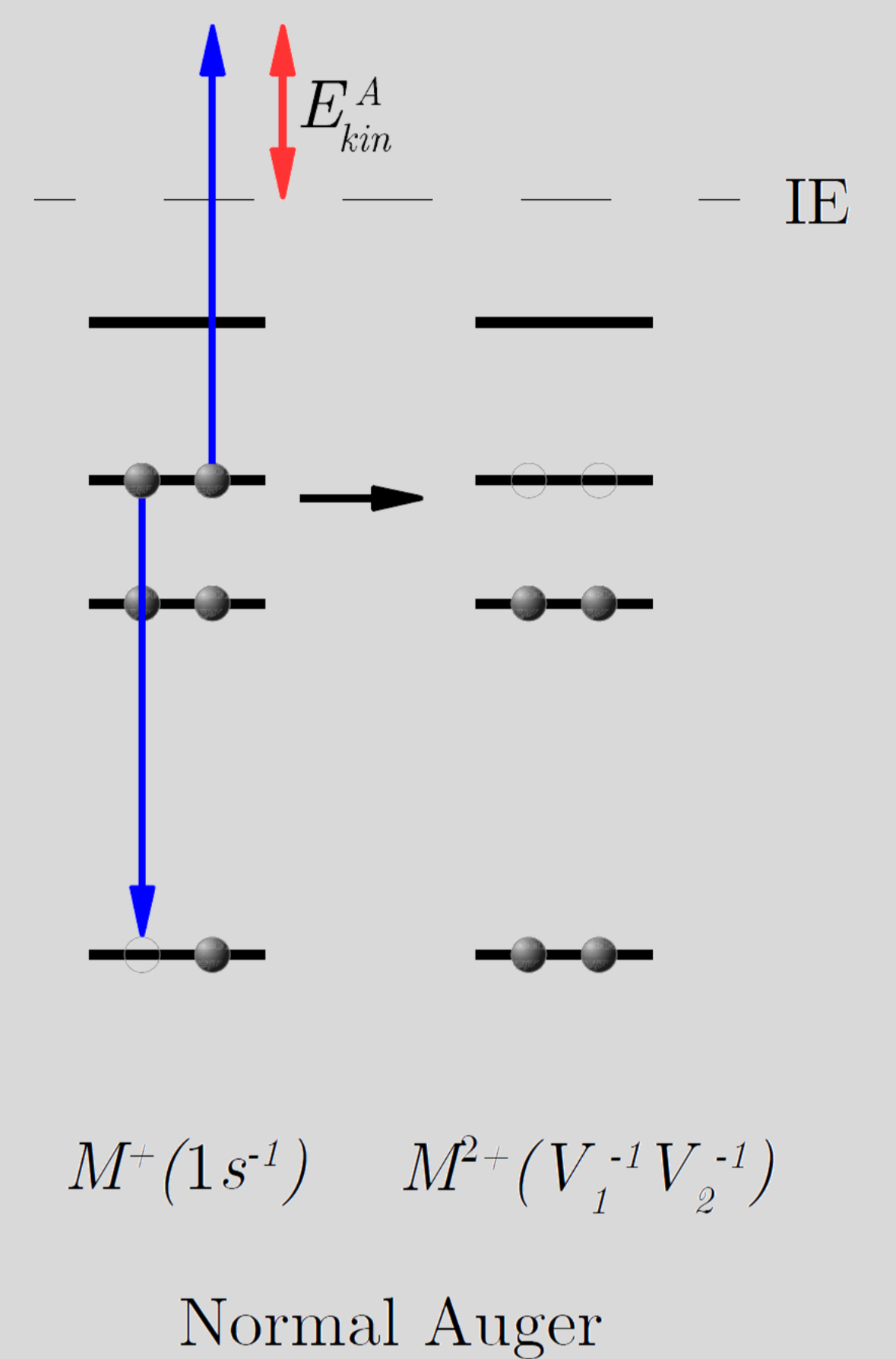
Theory

- Auger transition rates were calculated using the one-center approximation employing the Fermi-Wentzel golden rule

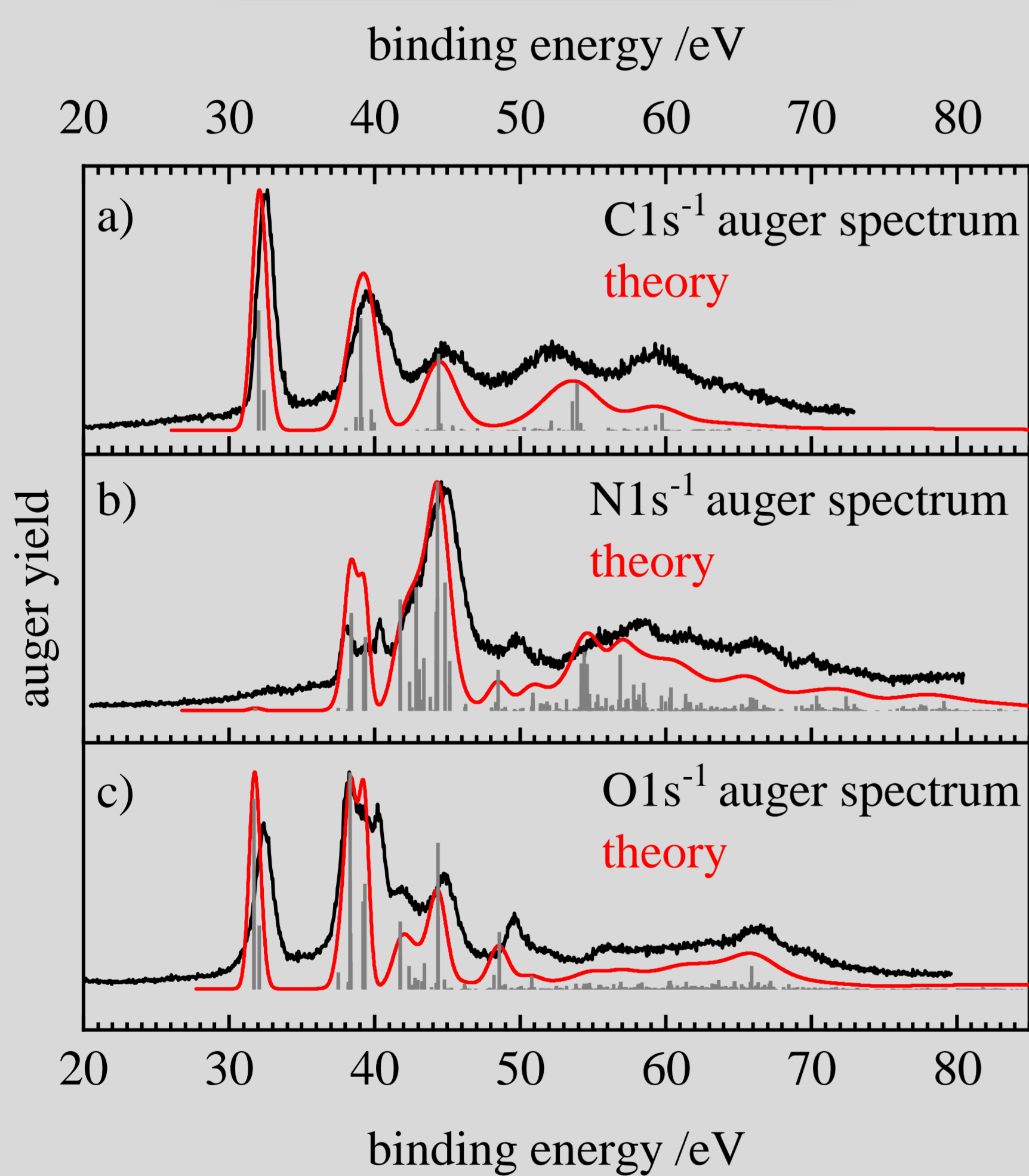
NEXAFS



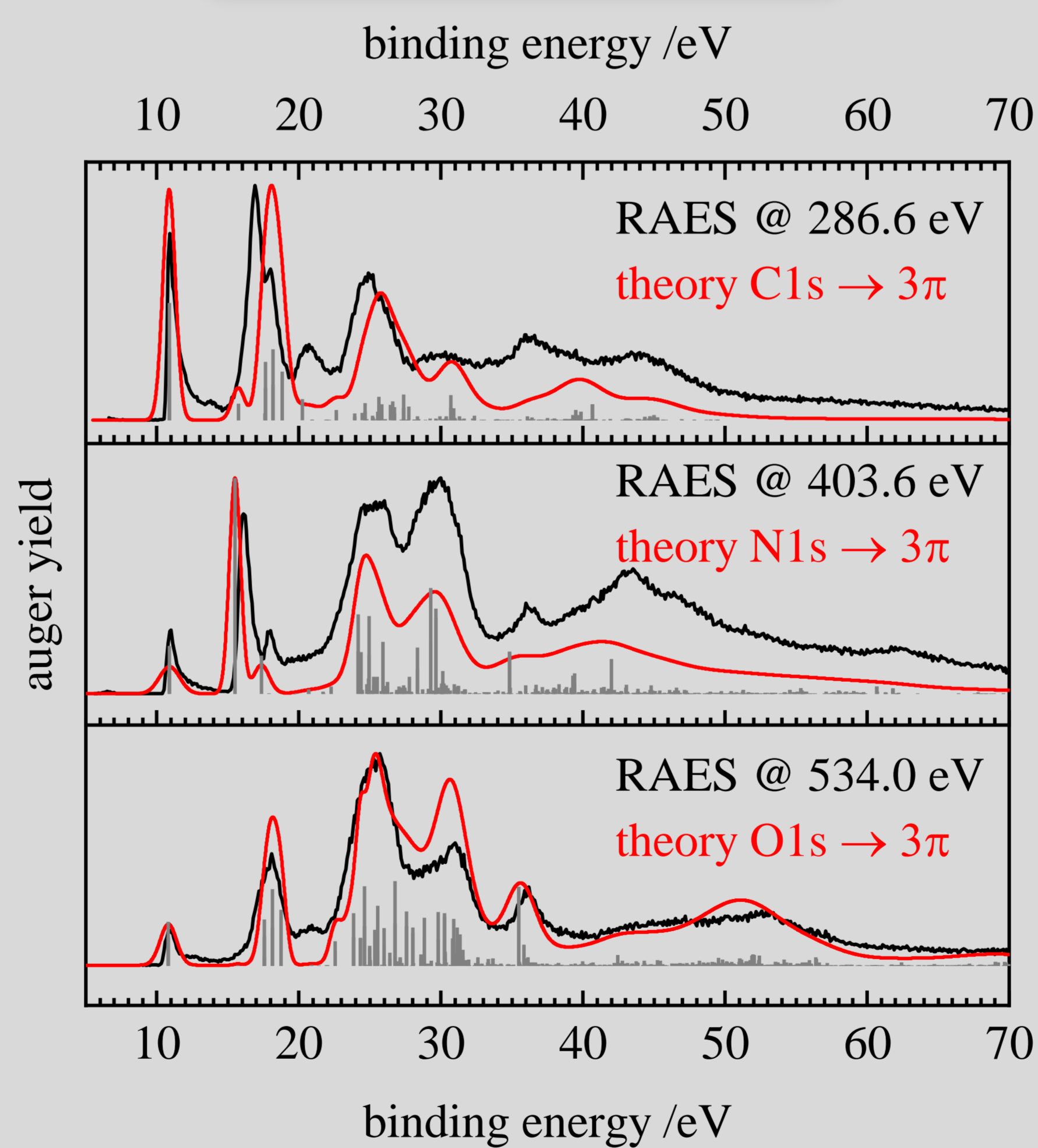
Auger process



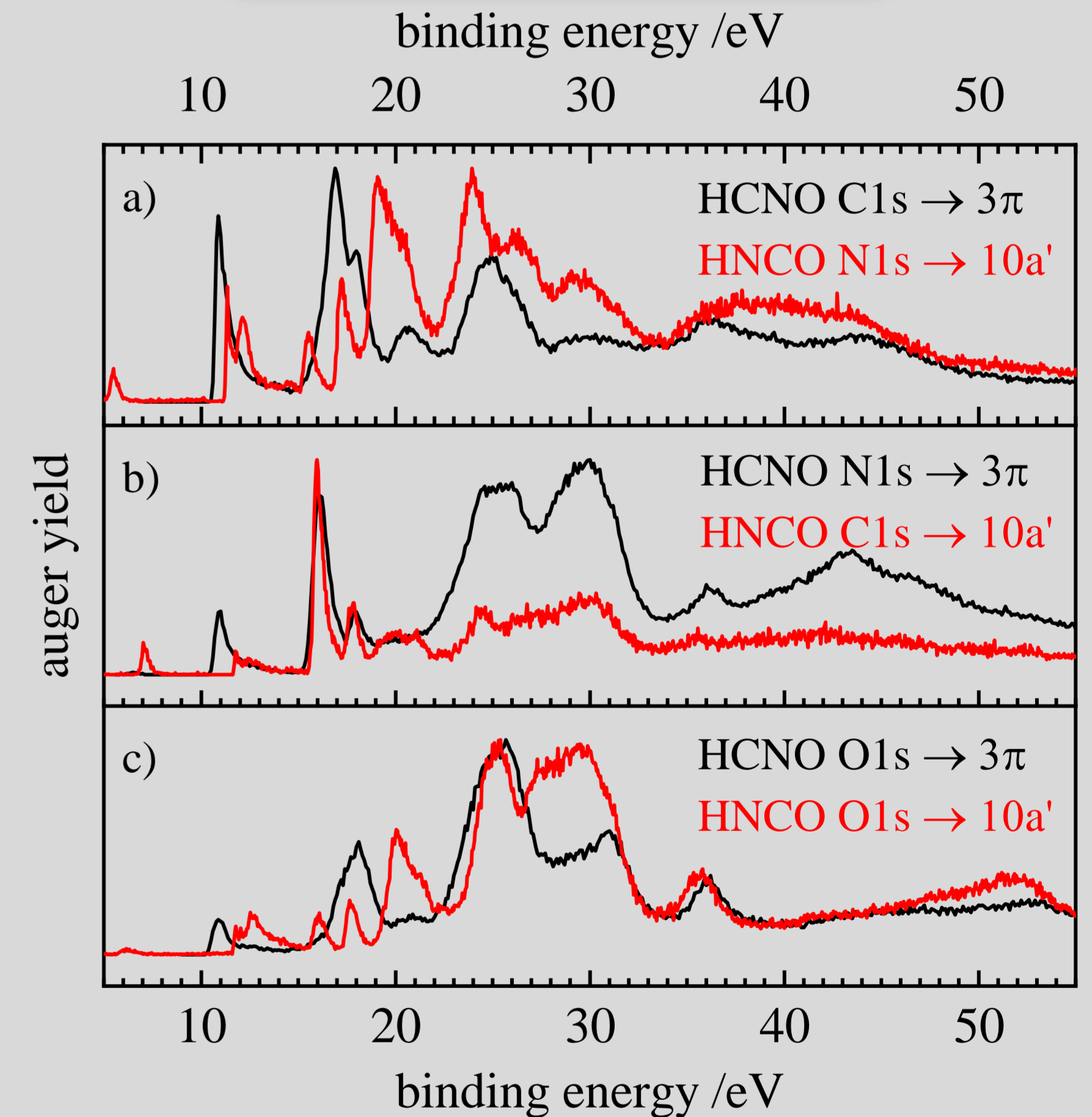
Normal



Resonant



Resonant



Conclusion

- We successfully recorded the auger electron spectra of fulminic acid
- Experiment and theory show good agreement
- Conduct auger electron photoion coincidence measurements using the EPICCA detector setup at the PLEIADES beamline

