

Illuminating Biomolecular Complexity: X-ray Free Electron Lasers and Vibrational Spectroscopies for Protein, Aggregates, and Cellular Architectures



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Single particle imaging of biomolecules using Coulomb Explosions.

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Single particle imaging of biomolecules using Free electron lasers (FEL) is an imaging technique that has been under development since the dawn of FEL:s more than two decades ago. Due to the heavy ionisation, biomolecules exposed to FEL pulses explode. In a recent publication (Phys. Rev. Lett. 134, 128403 (2025)) we have described how we can harvest information about the molecular structure of protein, solely but measuring the ions ejected from the explosion. In this simulation study we were able to separate protein structures that have identical amino acid sequences, but slightly different folding. This study opens up a pathway where it would be possible to use photon sources with wavelength that traditionally would not be suitable for imaging, like the AQUA instrument at EuPRAXIA@SPARC_LAB.

Scholarship eligibility

no

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