

# Oral Contributions

## [MS21-03] The Single Particles, Clusters and Biomolecules (SPB) Instrument at the European XFEL

Adrian Mancuso

*European XFEL*

The Single Particles, Clusters and Biomolecules (SPB) instrument [1] is designed to use the bright, coherent X-rays of the now under-construction European XFEL for imaging of single particles—in particular particles of a biological nature, but also elemental clusters and particles relevant to materials science. Potential samples include sub-micron crystals[2], viruses [3] and ultimately single macromolecules.

To enable this science, the SPB instrument will be a 3 keV to 16 keV, forward scattering x-ray instrument with focal spot sizes in the micron range and the hundreds of nanometers range. This wide range of photon energies allows for both scattering from weakly diffracting systems at 3 keV, as well as exploiting anomalous diffraction from metal centers in crystalline systems up to 16 keV. The spot sizes, both available across the energy range, cater to samples as large as micron scale crystals down to single macromolecules.

This presentation will outline the instrumentation planned to perform these biological imaging experiments. In particular, the required x-ray optics, sample delivery systems, detectors and overall instrument layout will be presented. Emphasis will be given to the novel focusing mirrors required to deliver the desired beam sizes over the wide energy range of the SPB instrument.

[1] A. P. Mancuso, European XFEL Technical Report, (2011) doi:10.3204/XFEL.EU/TR-2011-007.

[2] H. N. Chapman, et al, Nature **470**, 73 (2011).

[3] M. Marvin Seibert, et al, Nature **470**, 78 (2011).