"Between atom and cell"

MOSBRI
Molecular-Scale Biophysics Research Infrastructure

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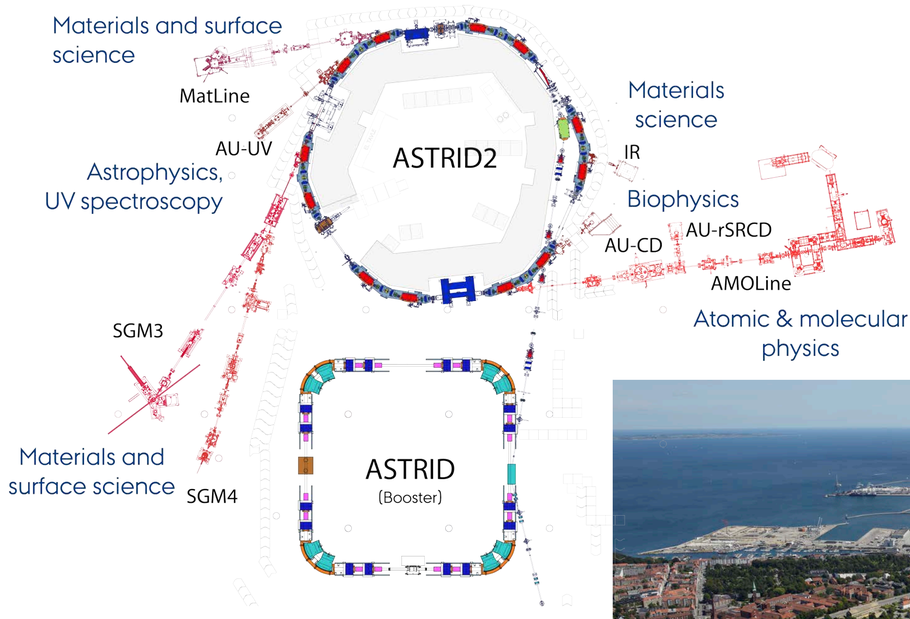
Synchrotron Radiation Circular Dichroism at MOSBRI partner AU-SRCD

MOSBRI partner AU-SRCD is based at the Department of Physics & Astronomy at Aarhus University in Denmark. AU-SRCD utilizes synchrotron radiation (SR) produced by the ASTRID2 storage ring (ISA), a facility where SR in the UV to the soft X-ray region is produced.



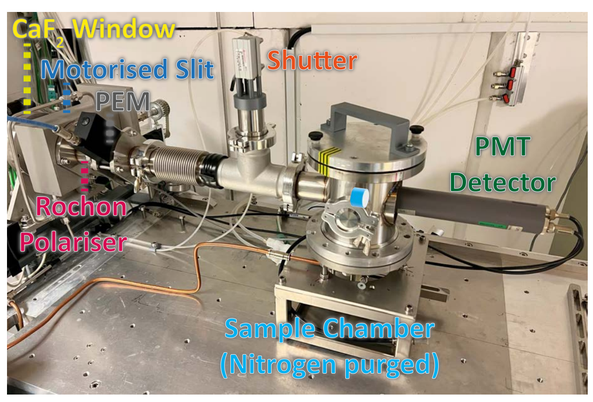
ISA

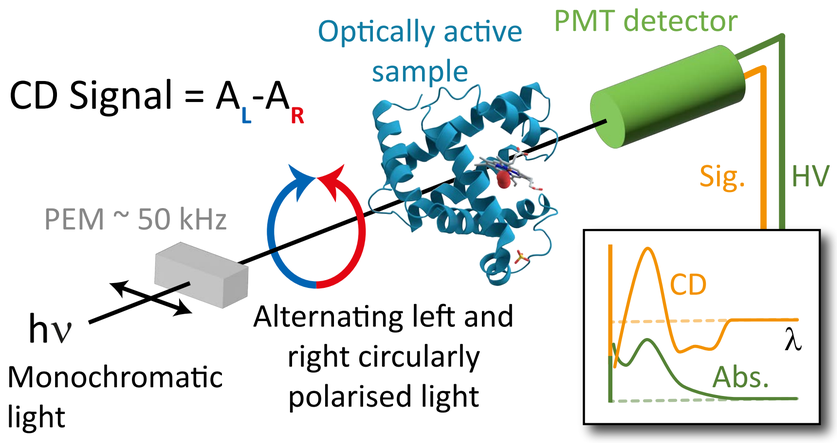
AARHUS UNIVERSITY
DEPARTMENT OF PHYSICS & ASTRONOMY

The main campus of Aarhus University, with Aarhus city centre and harbour in the background. © Jørgen Weber

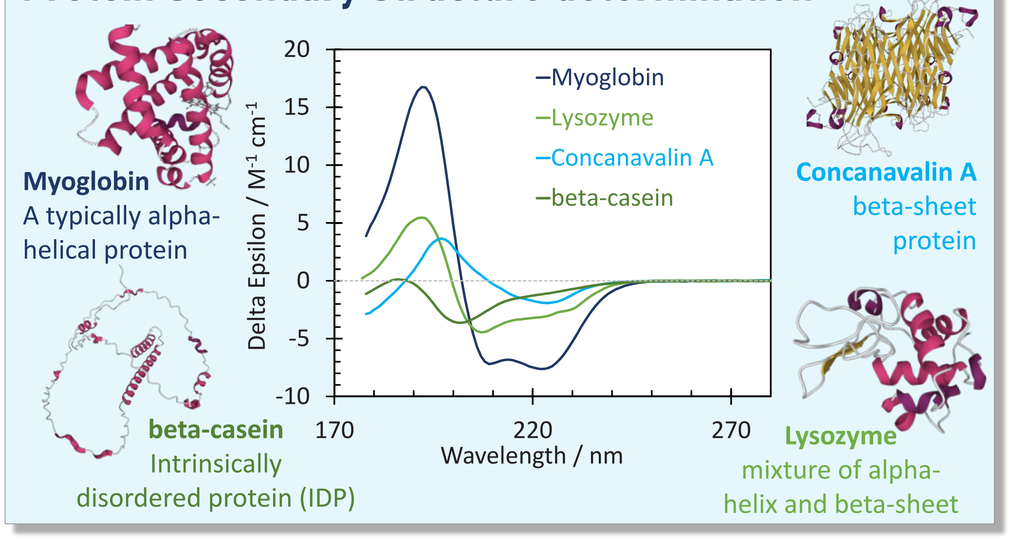
Circular Dichroism (CD) spectroscopy

...measures the difference in absorption between left and right handed circularly polarized light in chiral molecules. It is an established biophysical method probing the secondary structure (e.g. helices, beta-sheets, turns etc.) of peptides, proteins and nucleic acids which have distinct CD bands in the far-UV and VUV.





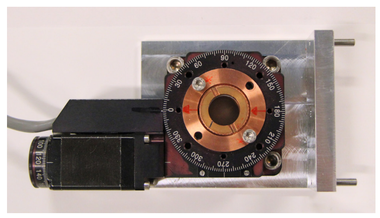
Protein secondary structure determination



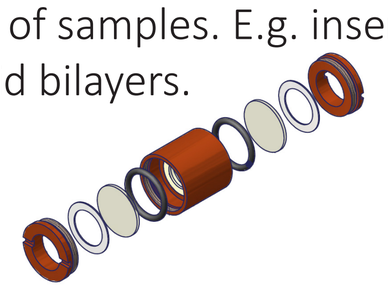
Measurement options

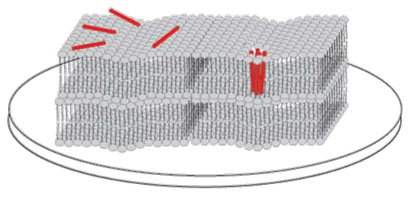
High intensity light source – Optimised for far-UV measurements, with light source available from 130 to 550 nm.

Temperature scans – 5 to 90C fully automated and integrated into the scanning programme using a macro file.

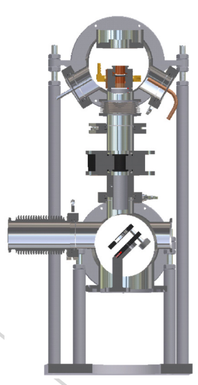


Rotational stage – Often used when studying films (solids) of samples. E.g. insertion of peptides into lipid bilayers.

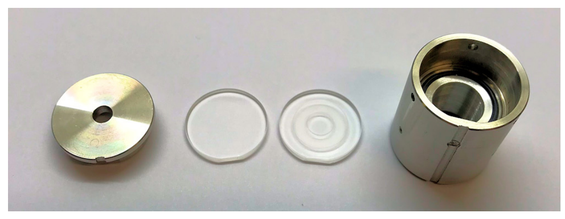




Periscope chamber – This allows samples to be measured in a horizontal position.

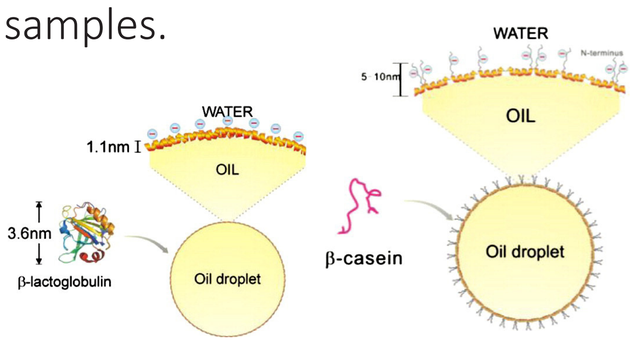


CaF_2 Cells – Low volume (3 µL), short pathlengths down to 2 µm. Good for measurement with highly absorbing buffers.



Difficult samples

Highly scattering samples – E.g. lipids, oil-water interfaces, aggregating samples.



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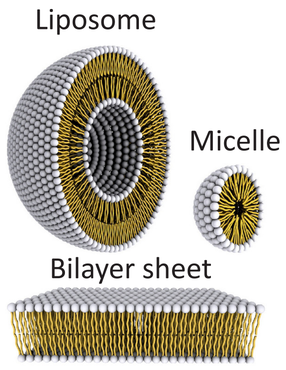

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For oil-water emulsions, can measure directly on the sample without refractive index matching.

When the particle size is comparable to the UV wavelelength, the samples can look like milk and require a high intensity light source for measurement.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004806