

Identification of single molecules within heterogeneous ensembles

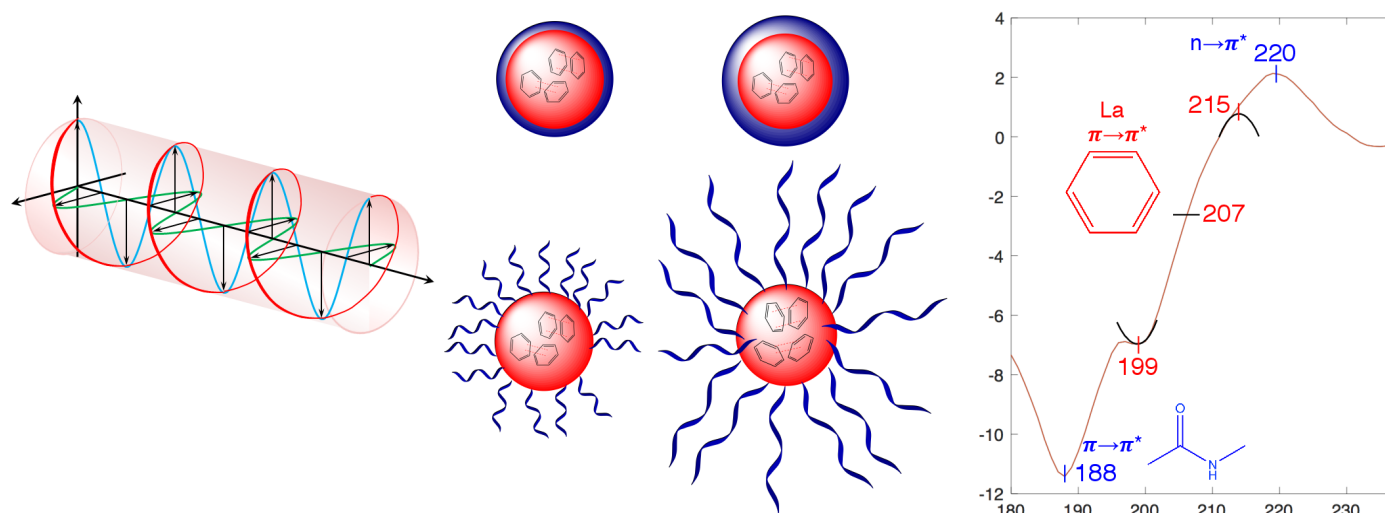
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Circular dichroism (CD) is a versatile tool to investigate the secondary structure of proteins, particularly when combined with synchrotron radiation (SR). Despite its high potential, this technique suffers from limitations in the interpretation of spectra and in the identification of single molecules within heterogeneous ensembles. My work aims at addressing these issues to exploit the full power of SR-CD.

Conventionally, CD signals in the far-UV region are primarily attributed to peptide bond absorption; likewise aromatic residue analysis has typically only focussed on the near-UV absorption characteristics.

In the first part of my talk, I analyse the conformational changes of antimicrobial peptides that impact on their antimicrobial activity, as a function of pH. I will also show that the emerging far-UV signatures inform on phenylalanine exciton coupling.



In the second part of my talk, I describe the use of SR-CD compatible microfluidic devices, fabricated using conventional polydimethylsiloxane-based (PDMS) soft lithography. The combination of microfluidics with SR-CD is highly promising for the study of protein interactions and misfolding in real-time. Their fabrication has so far been limited to fused silica devices because of the strong absorption of many materials in the far-UV region. The use of microfluidics to separate a heterogeneous mixture into time-resolved fraction combined with a bulk measurement technique like SR-CD opens up promising alternative avenues.

