TIME-RESOLVED CIRCULAR DICHROISM FOR PROBING THE CONFORMATIONAL DYNAMICS OF (BIO)MOLECULES

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Circular dichroism (CD), which measures the differential absorbance of left- and right-circularly polarized light, is a well-established technique for probing the secondary structure of proteins and nucleic acids in solution, at equilibrium. The combination of pump-probe methods with CD spectroscopy provides a versatile tool for investigating conformational and electronic changes in chiral molecules across a broad temporal range [1,2].

However, despite recent technological advances, time-resolved CD spectroscopy remains an experimental challenge due to the inherently weak signals and their sensitivity to polarization artifacts [2].

Over the past few years, we have developed a set of experimental setups enabling the detection of photoinduced CD changes over timescales ranging from a few hundred femtoseconds to several seconds [3]. In this talk, I will describe the underlying principles of these setups and highlight ongoing developments. Their capabilities will be demonstrated through studies of light-induced conformational changes in polymorphic G-quadruplex DNA structures [4,5].

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