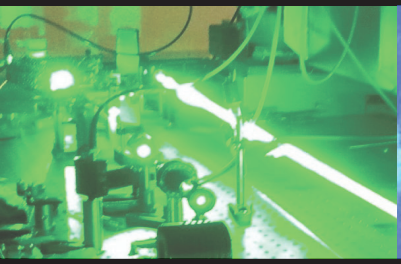
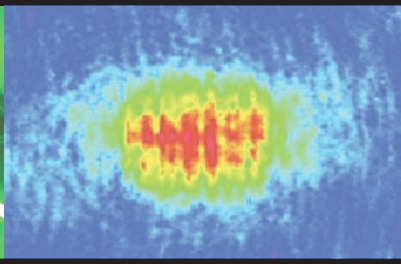
Joint UoC/FORTH AMO Seminar





12 May 2021, 18:00, Online Seminar

PhD Thesis Research

New directions in spectroscopic chirality detection in a buffer gas cell

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Chirality is a property of polyatomic molecules; they possess two versions called enantiomers that are non-superimposable mirror images. Current research focuses on answering two fundamental questions associated with chirality: 1) the origins of homochirality, and 2) measuring the energy difference between enantiomers due to parity violation. The answer to these questions, together with the understanding of its role in biological processes, its potential use as a signature of life in other planets, and its role in drug design, calls for sophisticated experimental tools able to determine precisely the ratio of enantiomers in complex chemical samples. This requires progress in both sensitivity and resolution of current scientific methods. I will review the main concepts behind microwave three-wave mixing, a chirality detection method that relies solely on electric field interactions and buffer gas cooling - a cooling method to prepare molecular samples in the gas-phase at 6 K. I will present our experimental results: an assignment-free method that can scan a sample for chiral molecules in enantiomeric excess, new avenues in buffer gas cell design for cold chemistry studies and chirality measurements in new species such as newly formed dimers and chiral radicals.

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