Activity Report

Experimental Investigation into Chirality Using Raman Optical Activity Measured by Dual Beam Modulation: Luxembourg, Australia, South Korea and USA

"…new ideas and approaches, with 75 new friends from all over the world, who together will shape the future of the international scientific community." Origin of the quote: ISSI coordinators reflecting on the program	**Photo of the Project** ***Please do not copy the picture here- send it separately, in .jpg format***
Photo of projector ***Please do not copy the picture here- send it separately, in .jpg format***	Determining the chirality of solutions is a key part of the pharmaceutical industry for drug development. While determining the chirality of organic substances is currently possible, the goal of this project was to create a novel system that could analyze these solutions in a considerably faster way, and to investigate whether it could be extended to the analysis of materials important for high-efficient data storage.
Camilla Hurst is currently an undergraduate student studying Materials Science at Oxford University. She participated in 2019 in the national contest "Jonk Fuerscher" with a project promoting wheelchair accessibility in nature. In this project, she developed a belt that can be attached to the wheels of any standard wheelchair to make it better equipped for outdoor use in an easy and cost-effective way. Due to the success of this project, she was given the opportunity to take part in a research project at the Weizmann Institute with the Dr. Bessie F. Lawrence International Summer Science Institute (ISSI) program. During this time, she researched with the Omer Yaffe group at the Department of Materials and Interfaces, Faculty of Chemical Sciences.	A molecule is said to be chiral if a non-superimposable mirror image of the molecule exists. There are several existing methods to determine the chirality of a substance by measuring the optical activity. This technique was extended to the vibrational spectrum, such as the Raman spectrum, to obtain higher resolution and a greater amount of structural information. While Raman Optical Activity has advantages in determining chirality, there is a desire to design a faster and higher resolution system. In this project, an emerging method named Dual Beam Modulation was adopted. To be able to do this, an optical setup of state-of-the-art equipment was laid out and tested on the organic chiral molecule 1-phenylethylamine. In addition, 2D organic-inorganic perovskites were synthesized and analyzed. These are hybrid materials formed by layering different types of materials for improved properties. The experimental setup presented noticeable advantages compared to previous setups: the analysis was successfully performed in a considerably shorter acquisition time, while

	using less power and obtaining higher resolution.
Project website address	