

## **Students' Annual Webinar**

### **Design and development of diagnostic tools for quantum state specific studies**

#### **Saurabh Kumar Singh**

The study of quantum state specific dissociation of molecules on metal surfaces gives insight into the elementary processes involved in the heterogeneous catalysis reaction. Molecules can be prepared in a specific quantum state (vibration, rotation, and translation states) in a molecular beam. For quantum state selective excitation in a molecular beam, one must first find these correct transitions and lock the IR source at that transition on a time scale of several hours. I am working on the design and building of a wavemeter which has accuracy ppm (0.01-1 cm) and wavelength deviation sensitivity up to ppb (0.001-1 cm) level. This will be used to guide the IR radiation source to find the exact excitation frequency and lock it. Besides this, I am working on the design and characterisation of an experimental set-up for quantum state selected detection of molecules in surface scattering experiments using ion imaging techniques. In this talk, I would like to talk mainly about these two diagnostic tools.

***Friday, May 6<sup>th</sup> 2022***

***5:00 PM***