

## **abstract**

MEMBERS SEMINAR

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

---

I will report on a joint work with Ronny Hadani (UT Austin) and Amit Singer (Princeton). We give an algorithmic solution to the two problems that appear in the title. The input is the numerical data (roughly, random plane sections of the molecule) obtained from the microscope. The output is the symmetry group and the shape of the molecule. In the lecture I will explain our algorithm and show how the representation theory of  $SO(3)$  and its finite subgroups (Cyclic  $C_n$ , Dihedral  $D_n$ , Tetrahedral  $A_4$ , Octahedral  $S_4$ , Icosahedral  $A_5$ ) is responsible for the correctness of the algorithm.