



## Physical Sciences Seminar

# Alignment and imaging of molecules inside helium droplets

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Host: Mikhail Lemeshko

In this talk, I will discuss the rotation of molecules embedded inside helium nanodroplets as observed in femtosecond laser induced alignment experiments. I will show that with the use of a sufficiently weak 450 fs alignment pulse, the molecule and its solvation shell can be set into coherent collective rotation lasting long enough to form revivals. With increasing laser fluence, I demonstrate that the revivals disappear and instead, rotational dynamics as rapid as those observed for an isolated molecule occur during the first few picoseconds. Classical calculations can trace this phenomenon to transient decoupling of the molecule from its solvation shell. I will also discuss the results of a more recent study, where I demonstrate that the rotation of molecules inside helium droplets can also be induced with the use of a mildly truncated 160 ps laser pulse. Finally, I present the results for the alignment and imaging of complexes formed inside helium droplets. In this study, I show that the structure of the carbon disulphide (CS<sub>2</sub>) dimer formed inside helium droplets can be determined from a covariance analysis of the S<sup>+</sup> and CS<sub>2</sub><sup>+</sup> ions.

**Tuesday, January 23, 2018 11:00am - 12:30pm**

Big Seminar room Ground floor / Office Bldg West (I21.EG.101)



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.