

B.Th/ M.Th

Precision spectroscopy of tritiated water species

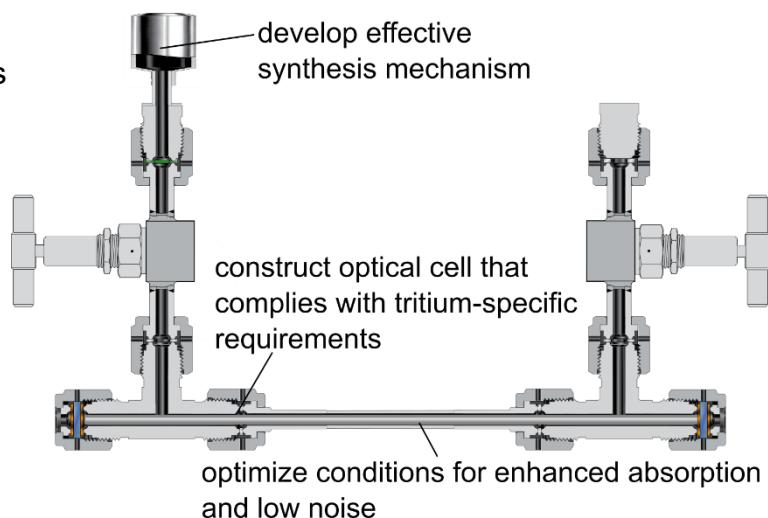
Motivation

Exchanging the hydrogen with tritium (^3H) in molecules (here water) drastically influences the rotational and vibrational energy structure in the molecule. Therefore, high-resolution infrared spectra of so-called *tritiated* molecules allow for fundamental tests to quantify these isotope shift and symmetry breaking effects.

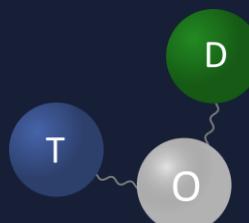
To obtain high-resolution spectra, an optical cell for Fourier transform infrared spectroscopy (FTIR) needs to be developed, measurements performed and resulting spectra analysed!

Your task

- ❖ Develop an optical cell that complies with the requirements regarding the synthesis, optical properties, and tritium-compatibility.
- ❖ Measure spectra using FTIR-spectrometry.
- ❖ Calibrate the spectra using absorption signatures of precisely known species (e.g. CO_2 , CH_4 , ...).
- ❖ Assign, yet not measured, absorption signatures from tritiated water species using a dedicated and modifiable python-software.
- ❖ Analyse data and be in exchange with international theory experts.



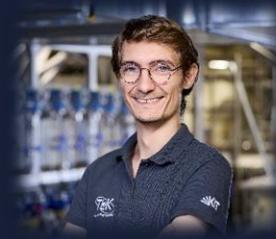
Be co-author of an impactful publication for molecular physics!



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