Recap of the Measurements

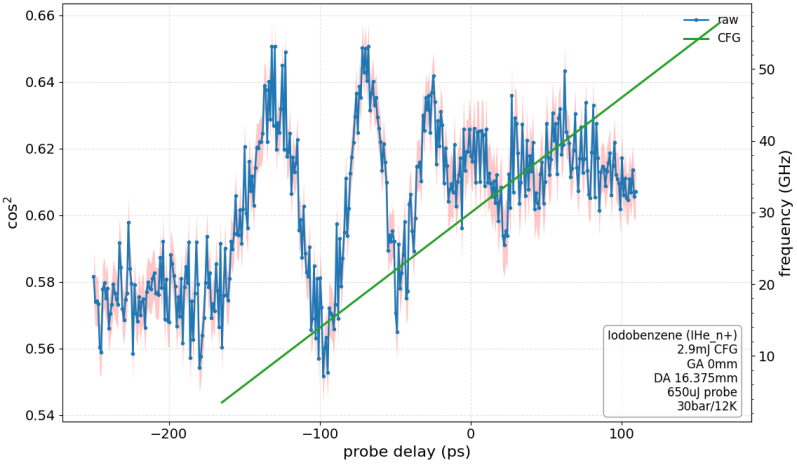
What we did in October

November 6, 2025

Outline

Outline

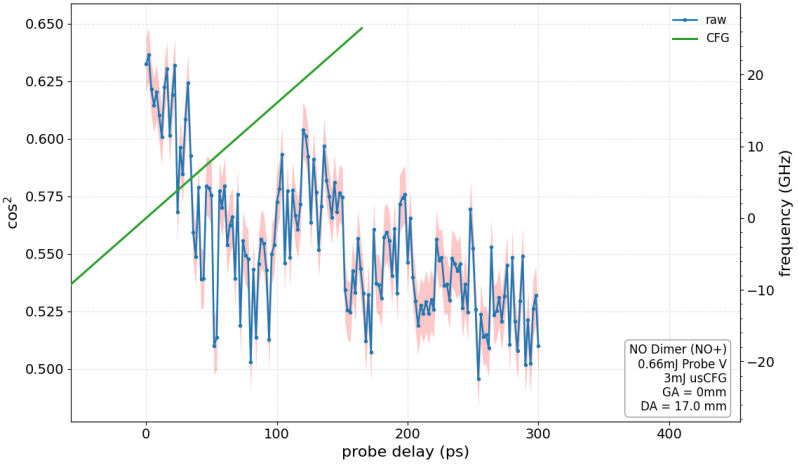
Iodobenzene in Droplets



Information

- No serious analysis
- convenient to see oscillations with new centrifuge
- moved on to simpler molecules

NO-Dimer in Droplets

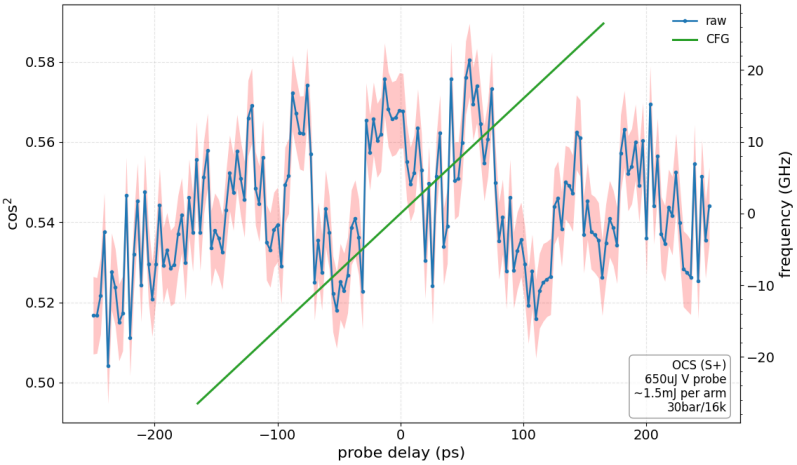


Information

- also a molecule with a more complex structure
- similar to Iodobenzene - we have no Kick data to compare & can't use it in jet

Outline

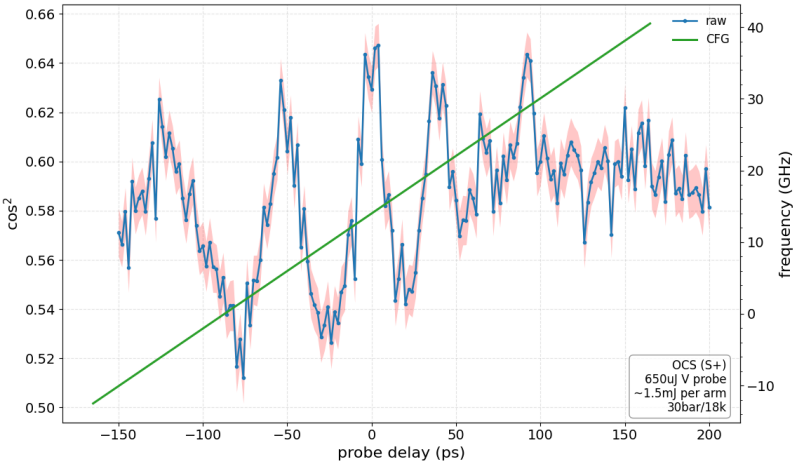
OCS in Droplets - rotation direction change



Information

- Changed DA position
  - rotation direction changed

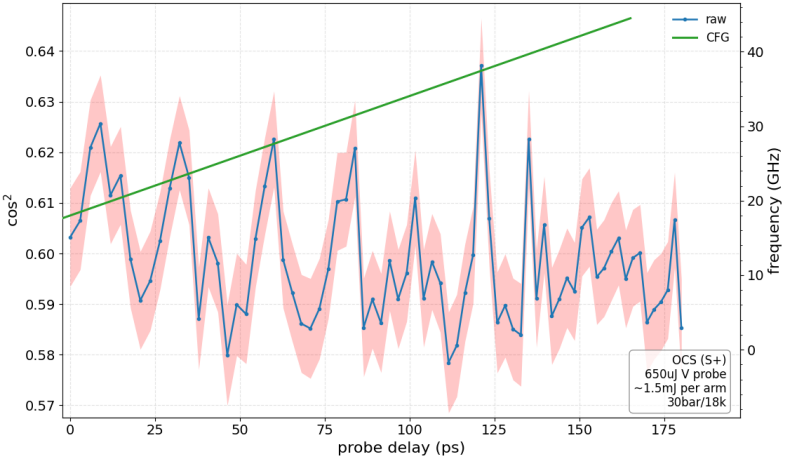
OCS in Droplets - oscillations nearly over the whole centrifuge



Information

- good oscillations

OCS in Droplets - where do the oscillation end?



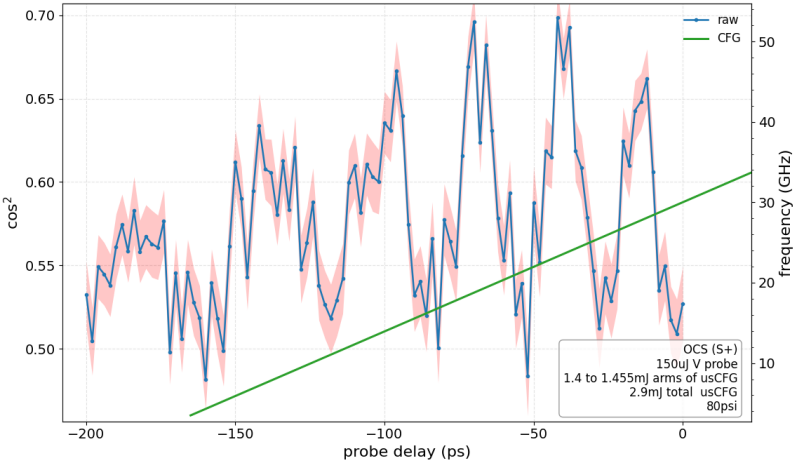
Information

- nearer look at the where the measurement stops following the rotation

Questions

- How do we quantify the oscillations?
- How reproducible is this?
- Is the reduced contrast due to helium environment? (compare to jet)

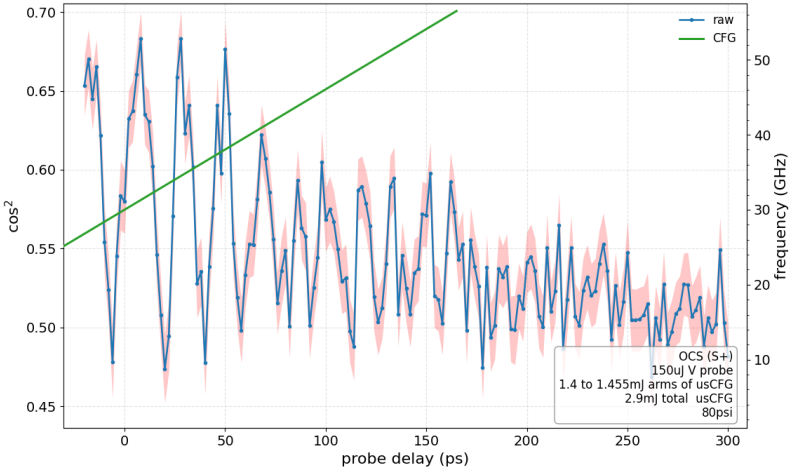
OCS in Jet - begin of oscillations



Information

- start of rotations
- over low frequency ramp-up it looks similar to droplets

OCS in Jet - end of oscillations



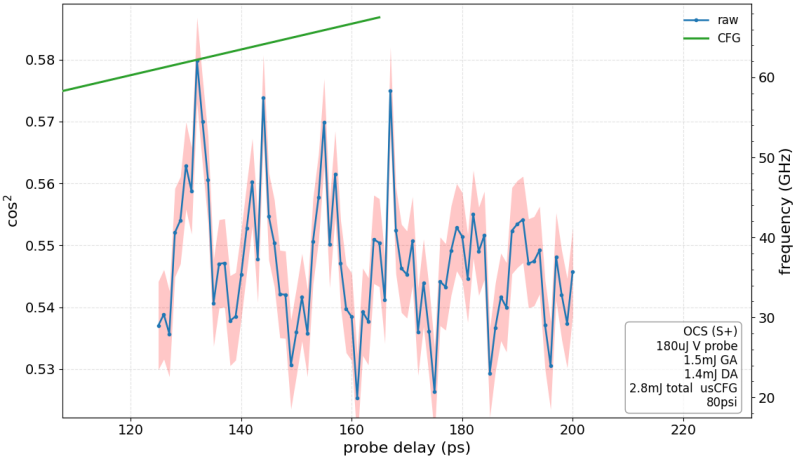
Information

- end of rotations
- same centrifuge as for the last slide

Notes

- Safe to say that it is still spinning at 40 GHz

OCS in Jet - very end to field free



Information

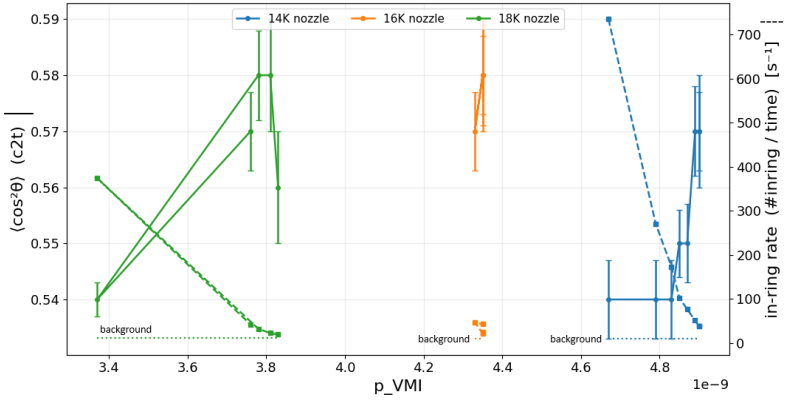
- changed starting frequency
  - moved 40 GHz to the more intense part of the field profile

Questions

- Again: How we define if we still see oscillations?

Outline

Optimization of monomer conditions



Information

- optimization the doping for different He droplet sizes
- ring size: 60 - 120 pixels
- polarization
  - probe: vertical
  - DA: horizontal

Notes

- not obvious which droplet size is ideal
- very sensitive to small VMI chamber pressure changed

Optimization of monomer conditions

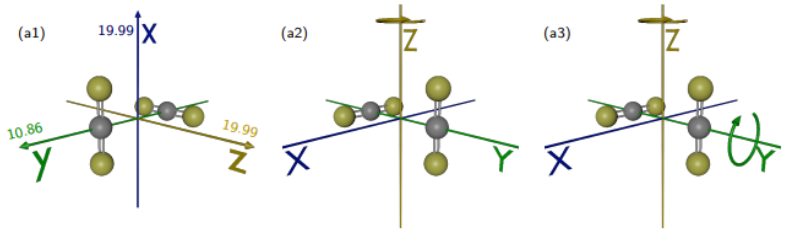


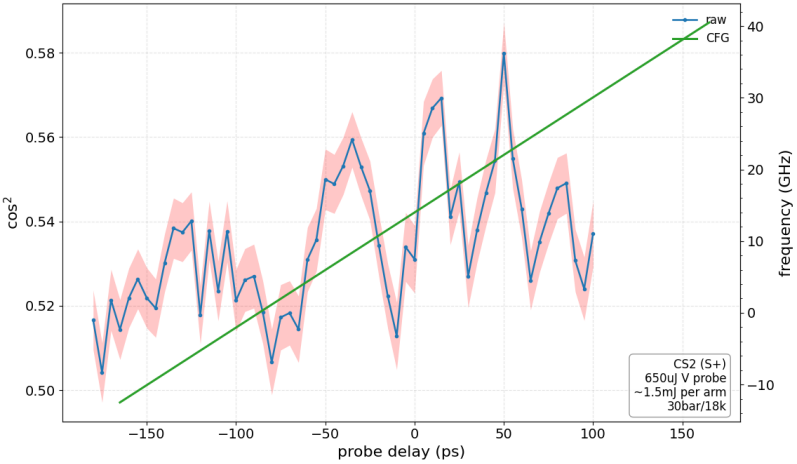
Figure: Sketches of possible (CS2)2 structures [a]

Information

- doable because of difference in monomer/ dimer structure
  - S+ ions only come along alignment pulse for monomers

[a] Pickering, J. D. (2017): *Alignment and Imaging of Molecular Complexes Embedded in Helium Nanodroplets*. PhD thesis, Aarhus University.

CS2 in Droplets - begin of centrifuge



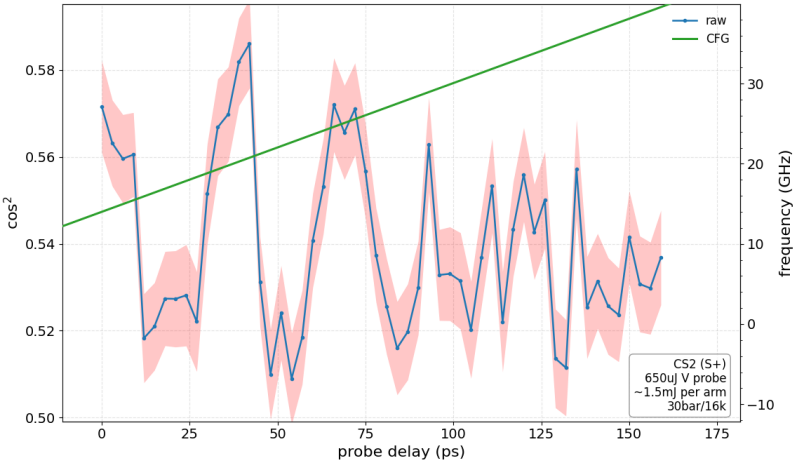
Information

- begin rotation

Notes

- for low frequencies looks like all other molecules

CS2 in Droplets - rotations at the centrifuge end



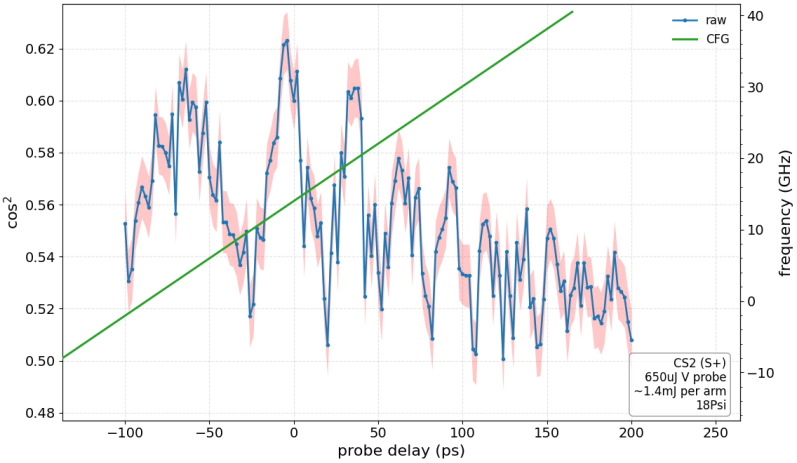
Information

- end rotation

Questions

- Is it still spinning at 20 GHz?
- What's the uncertainty of the CFG?

CS2 in Jet - oscillations in gas phase



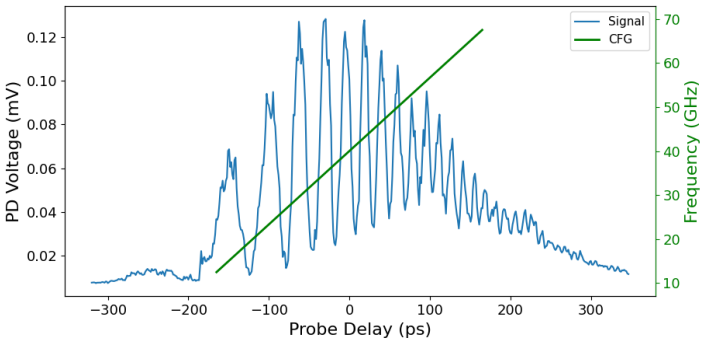
Information

- nice oscillations
- not exactly the same centrifuge as for droplets

Notes

- Around 0-50 ps it's qualitatively the same as in droplets

Cross Correlation - weird amplitude change



Information

- position of the cone can change depending on which arm of the centrifuge comes first
- never measured at the low frequencies

Notes

- could influence spinning of molecules for higher frequencies

Questions?

Thank you for your attention!