Target Rotation Option

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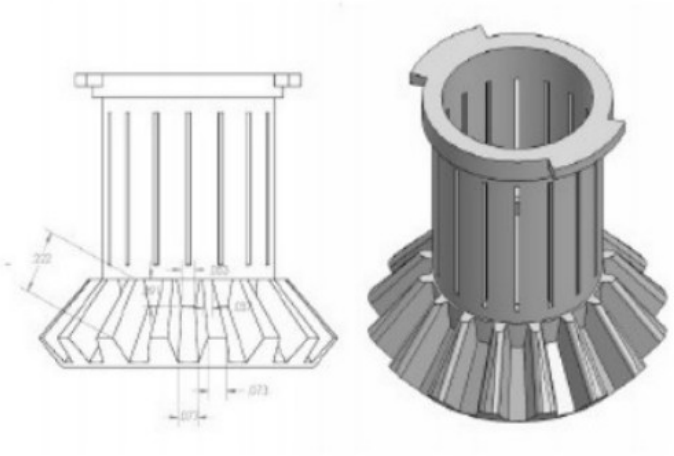
UVA

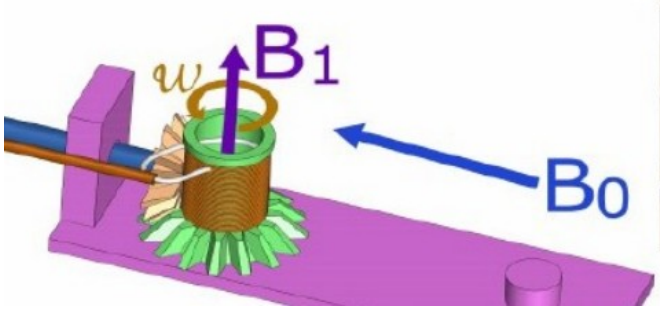
A look at target needs

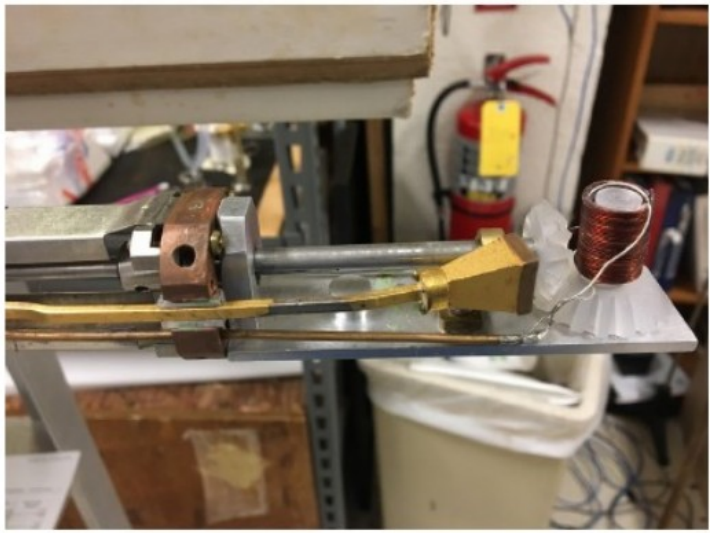
- How fast do we need to rotate?
- January cooldown results
- Moving actuator fast
- Alternatives

Rotating Designs



- Kel-F $(C_2ClF_3)_n$ cup and driving gear
- Motor outside cryostat
- NMR coil around cup
- Already used with several designs at UVA
- 1 Hz achieved with no problem
- Fixed beam spot



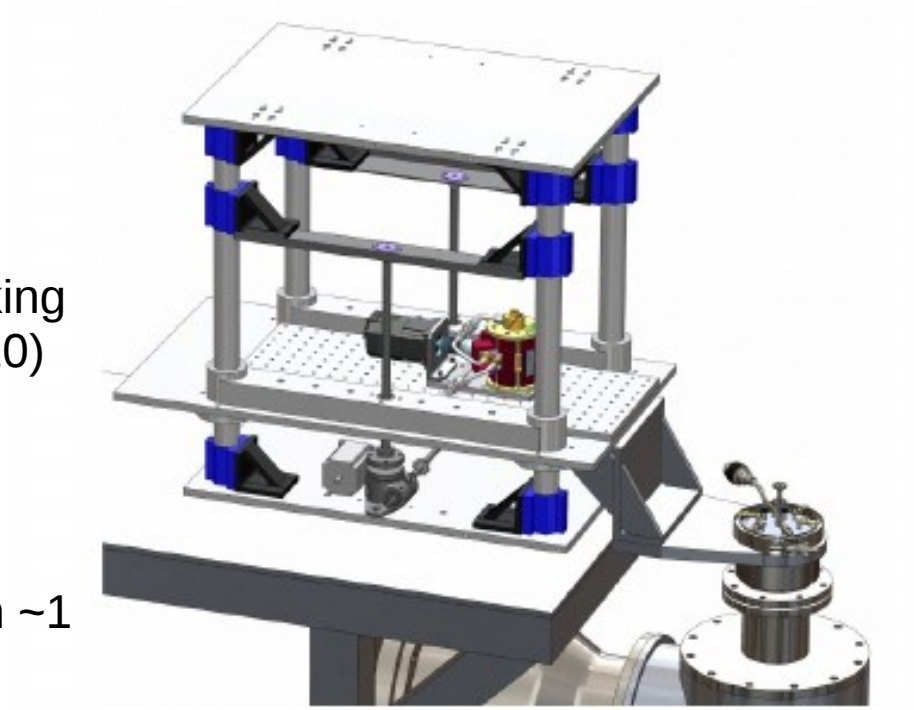


Actuator Concept

- Accurate vertical motion
- Could move reasonable fast (~cm/sec)
- Fast movement not part of design

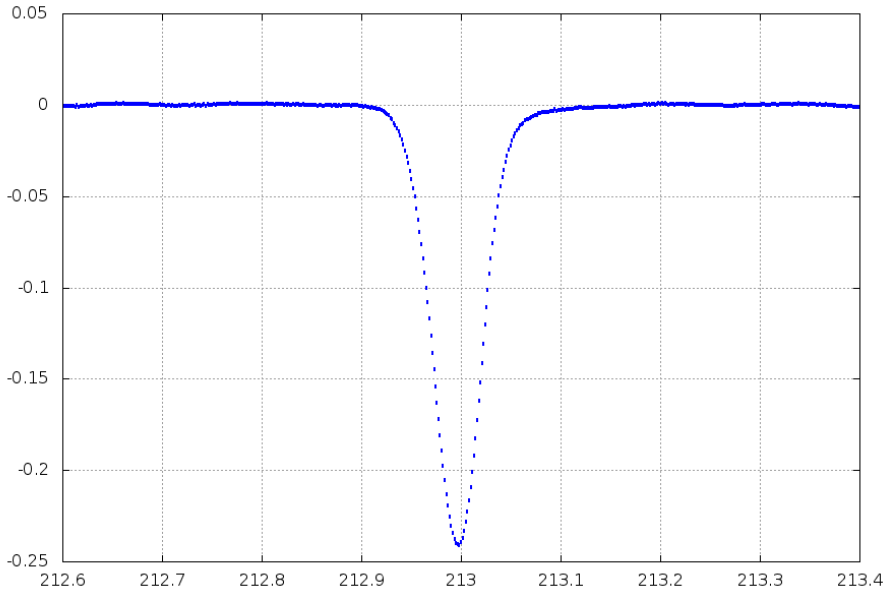
How Fast Do we Need

- Average target irregularities: density and packing with greater number of revolutions per run (~10)
- Other false asymmetries?
- Slower is better for vertical motion
- For beam cooling still need continuous motion ~1 rev/several seconds

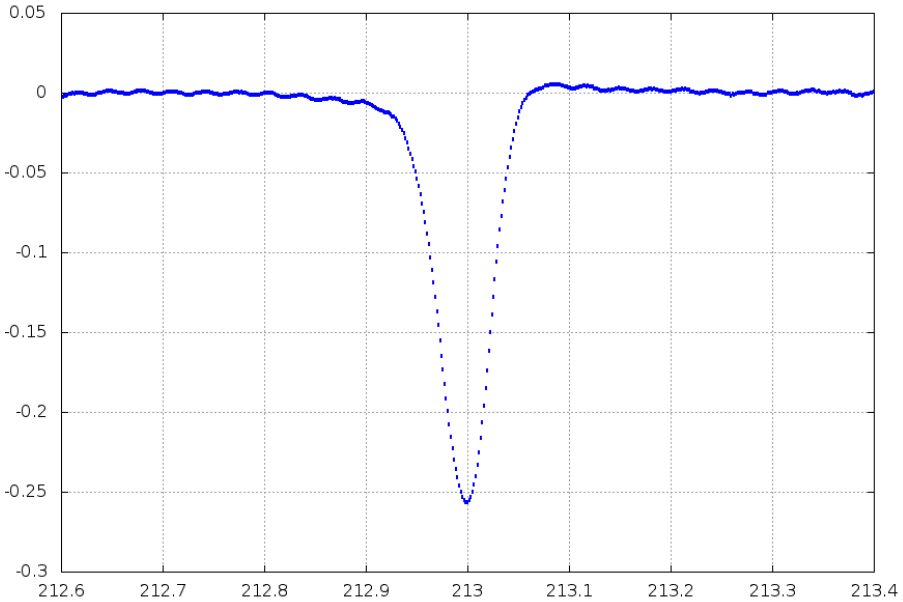


January Cooldown Results

Rotation Shows Change



Mechanical noise

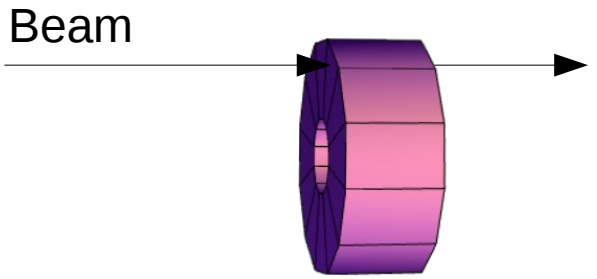


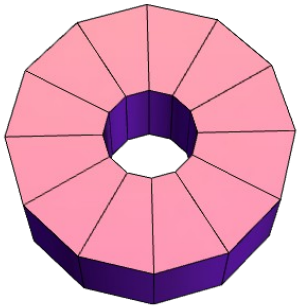
Moving coil NMR-Check

- Slow moving coils show no NMR change
- Fast movements hard to study
- Noisy from mechanical vibration

Doughnut Style

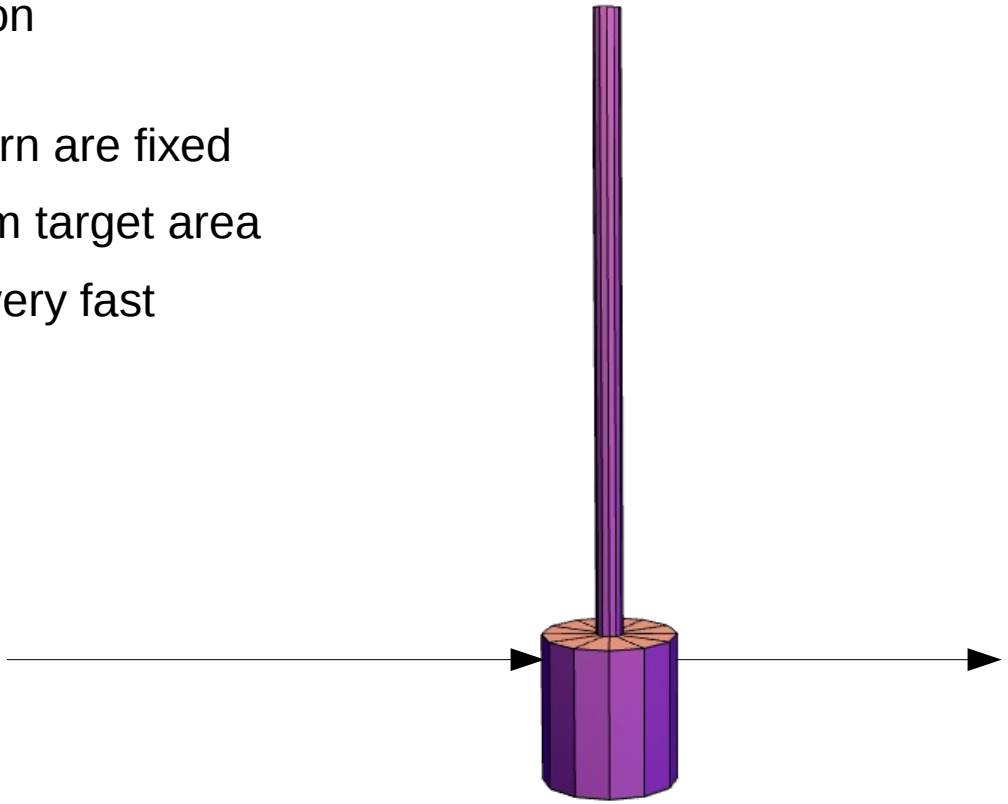
- Slow movement up and down (small discrete steps)
- Rotate many times in one vertical position
- NMR still around outside
- Still driven by gear and actuator
- Probably limited to a few times per second
- Some size loss





Vertical Cylinder

- Needs thin target cell (aluminum can)
- Potentially hold much more material in one load
- Slow up and down motion
  (small discrete steps)
- NMR and microwave horn are fixed
- NMR samples only beam target area
- Can be made to rotate very fast



Vertical length could be significantly extended

What are Our Target Requirements

- Fixed Beam Spot
- Rotation Speed
- Fewer Target Loads
- What else?