

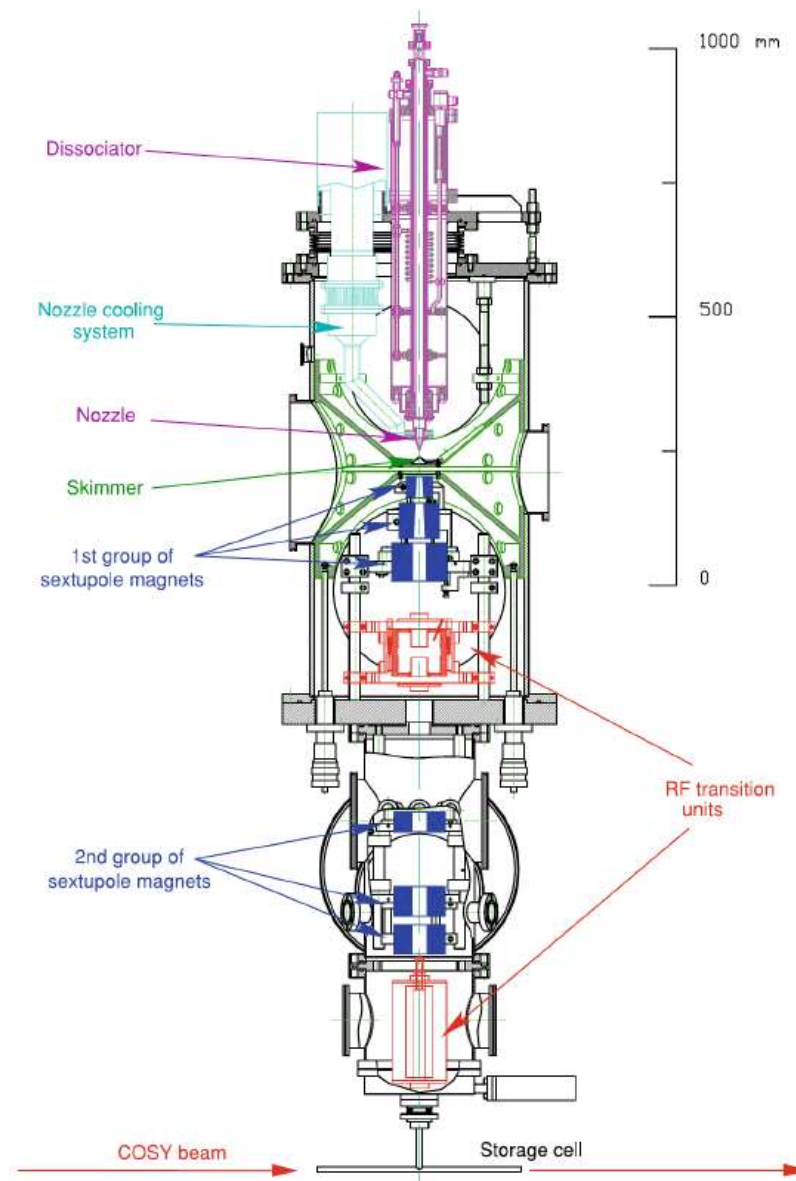
THE ANKE POLARIZED ATOMIC BEAM SOURCE FOR EXPERIMENTS AT GSI

PSTP2020, SEPTEMBER 29, 2022 | ALEXANDER NASS

SETUP

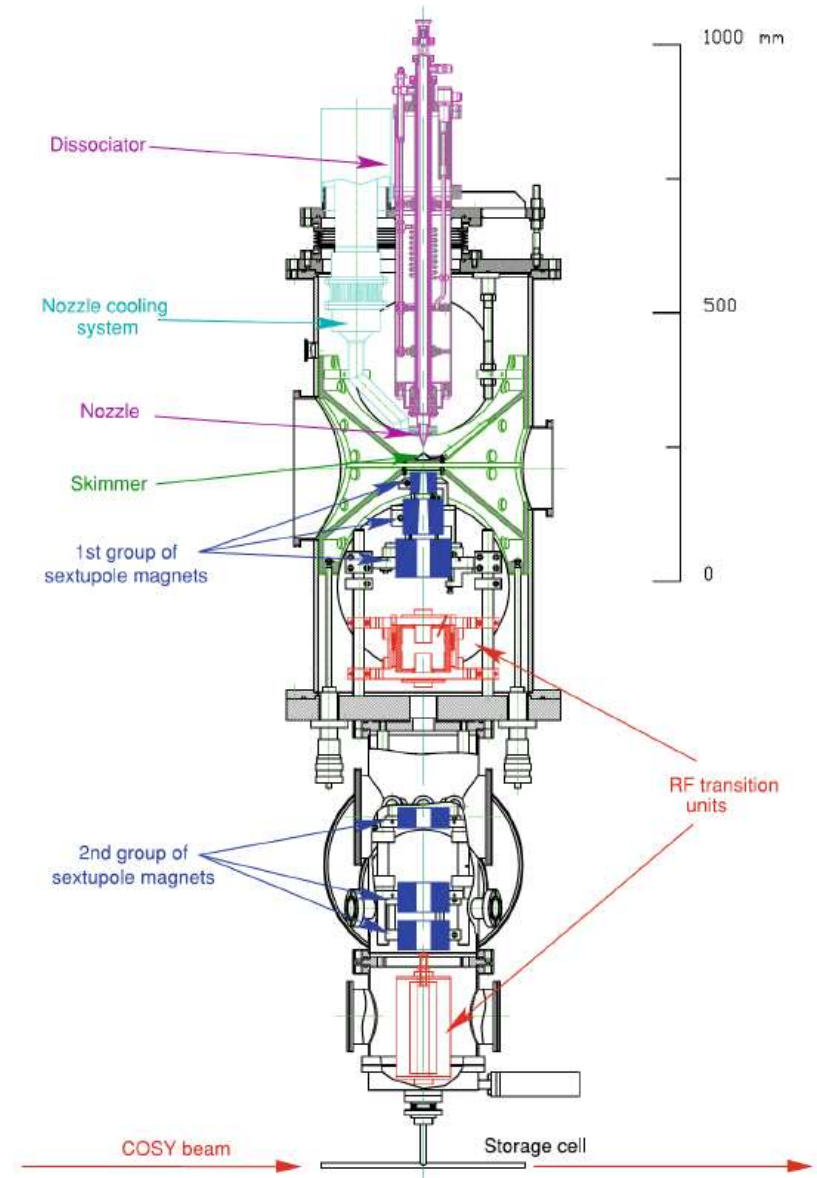
Two cylindrical vacuum vessels mounted above and below a central support plate hosting:

- Radio frequency driven **dissociator**
- **Sextupole system** to separate the atoms according to their electron spin state
- **Radio frequency transition units** to exchange the population of hydrogen hyperfine states
- Injection modes with one or two hyperfine states for operation in low or high magnetic field around the interaction point



PERFORMANCE

- Output intensity: $7.5 \cdot 10^{16}$ atoms /s (two hyperfine states)
- Nuclear polarization $p_z = \pm 0.92$ (one hyperfine state)
- Electron polarizations in the same range
- ABS is optimized for flux \rightarrow **needs to be optimized for maximal density** using the possibility to adjust the speed of the atoms with the nozzle temperature



ADDITIONAL ITEMS

- **Magnetic field** around the **target chamber** to align the spins of the target atoms (A system of low field coils is more flexible in order to change the direction of the field in xyz, but mixed hyperfine states cannot be used → reduced density)
- **Polarimeter** (e.g. Breit-Rabi or Lamb shift polarimeter) necessary to monitor the polarization during the experiments

