

Atomic Checklist

Use Yb174

- **B field alignment using Henle resonance.** Turn off main coil (z axis), then minimize counts on all three compensation coils independently. Turn back on main coil.
- **B field alignment using Raman beams.** If the polarisation of the Raman beams is set correctly to σ_- , σ_+ with the correct detunings, then when you have both Raman beams hitting the ion it should fluoresce. When only one is on then it should go completely dark.
- **935 saturation.** Turn down 935 power and measure counts. It should be set to saturate so a small change in power doesn't change counts.
- **935 polarisation.** Move fiber paddles to maximise counts, then move HWP to also maximise counts.
- **D state pump times.** Measuring the pump times into and out of the D state can tell you how well things are hitting the ion independent of anything else.
- **Check beams overlap.** Use beam profiler in two different positions to check beam overlap.
- **Make sure beams are going through center of lens.** Set the shuttle position to the mirror position (864) and check the lasers are going through the center of the lens.
- **Run Electrode Compensation code.** Compensate for stray electric fields.
- **370 power saturation.** Measure the saturation power of cooling laser. Use lens position to maximise it.
- **Check resonance.** Sweep 935 frequency and fit Gaussian to check where the resonance is. Can also use 370 but make sure you don't go above 0 Mhz detuning or else you could loose the ion as it heats up.
- **Check cooling laser polarisation.** Should be horizontal with B field (For 174 only).
- **Measure pump times into and out of the D state.** Can be used to diagnose issues with 935 pointing.
- **Check zeeman splitting.** Zeeman effect generally reduces counts with Yb174.
- **Check beam pointing.** Move lens position to maximise counts/doppler saturation parameter.
- **Adjust weights of electrodes.** Ex, Ey will move the ion with the electrodes and can sometimes help increase counts by position the ion better in the path of the lasers.

Once these have all been done then the counts 'should' be higher, ideally about 160,000 c/s.