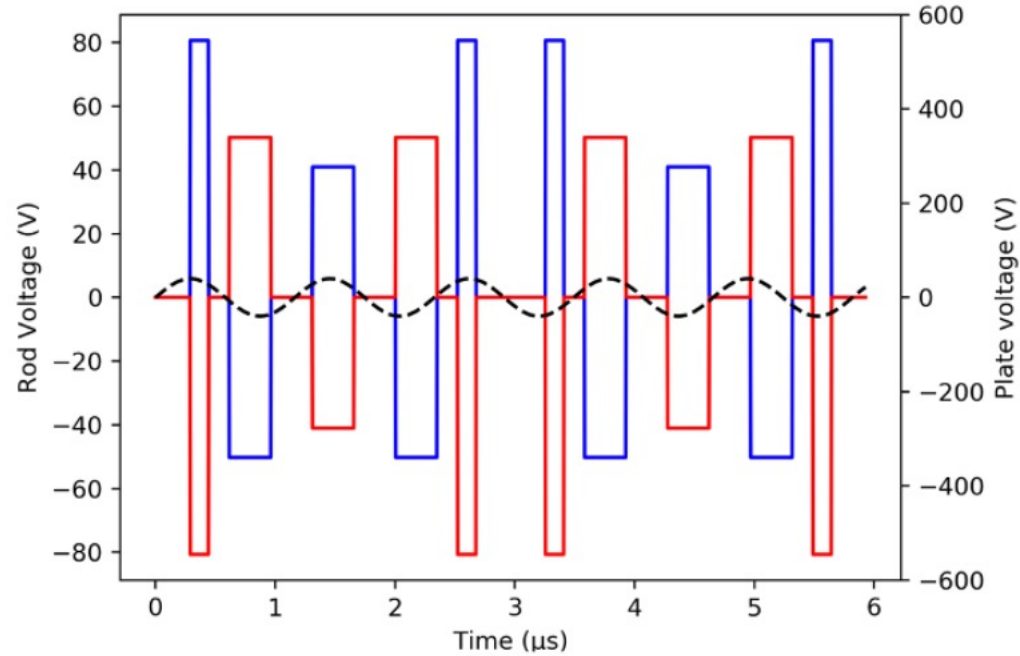


IBEX update

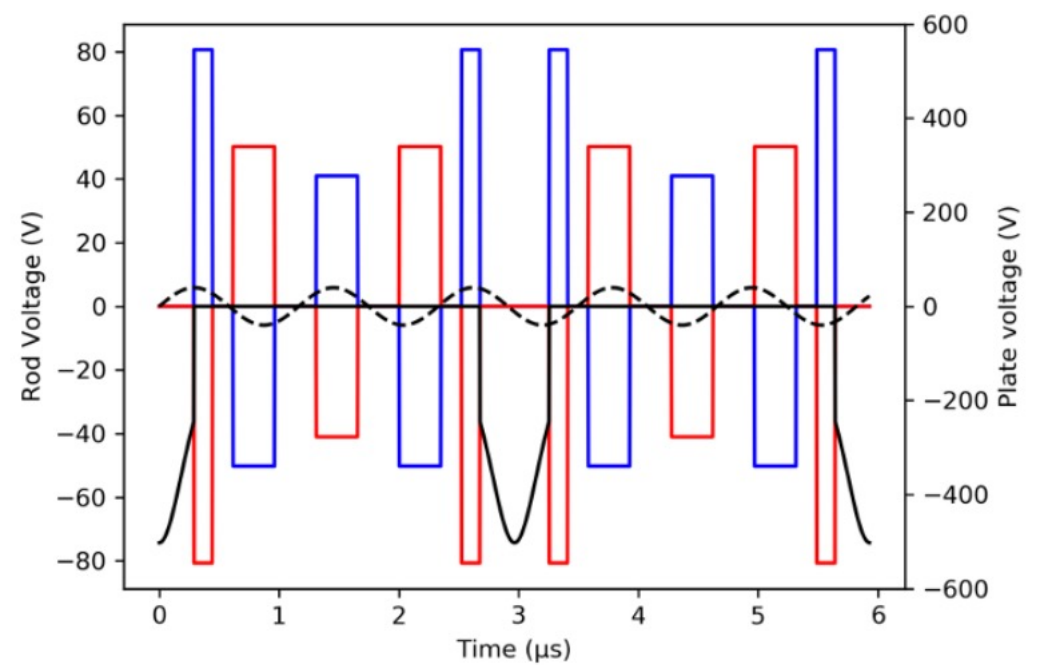
Jake Flowerdew

4th order (octupole) perturbation

Oct. OFF, Pert. ON



Oct. ON, Pert. ON



4th order perturbation scan (Sim.)

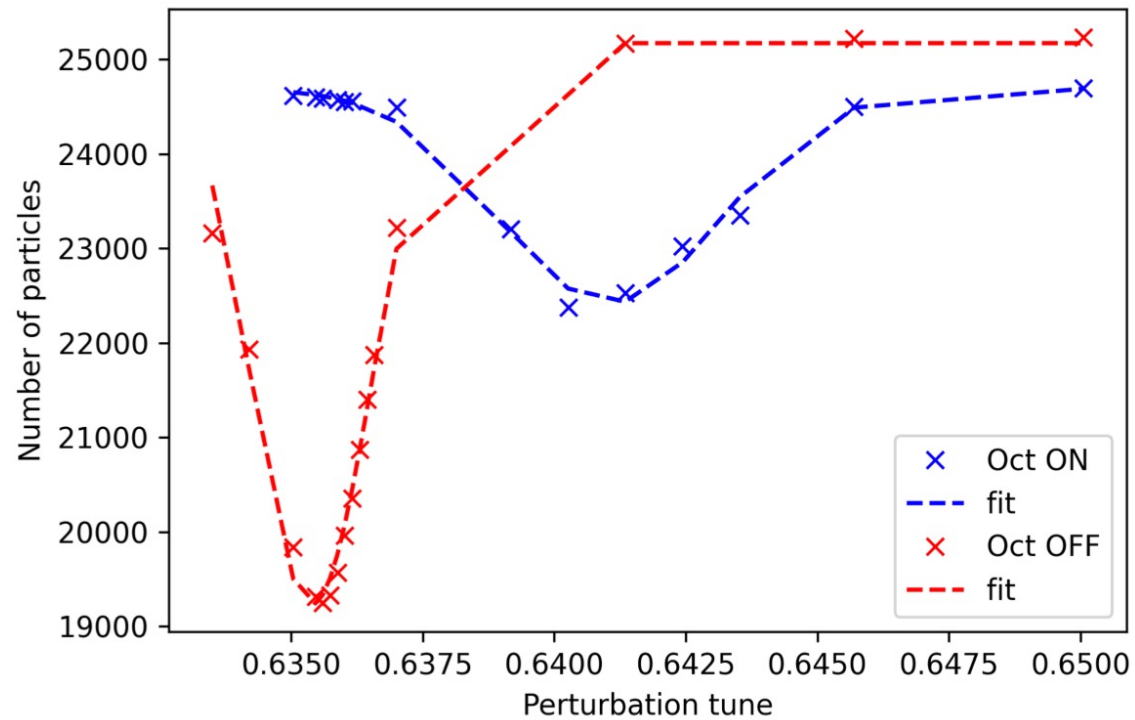


Figure 5.13: Number of particles plotted against the perturbation tune corresponding to the perturbation frequency.

4th order perturbation scan (Exp.)

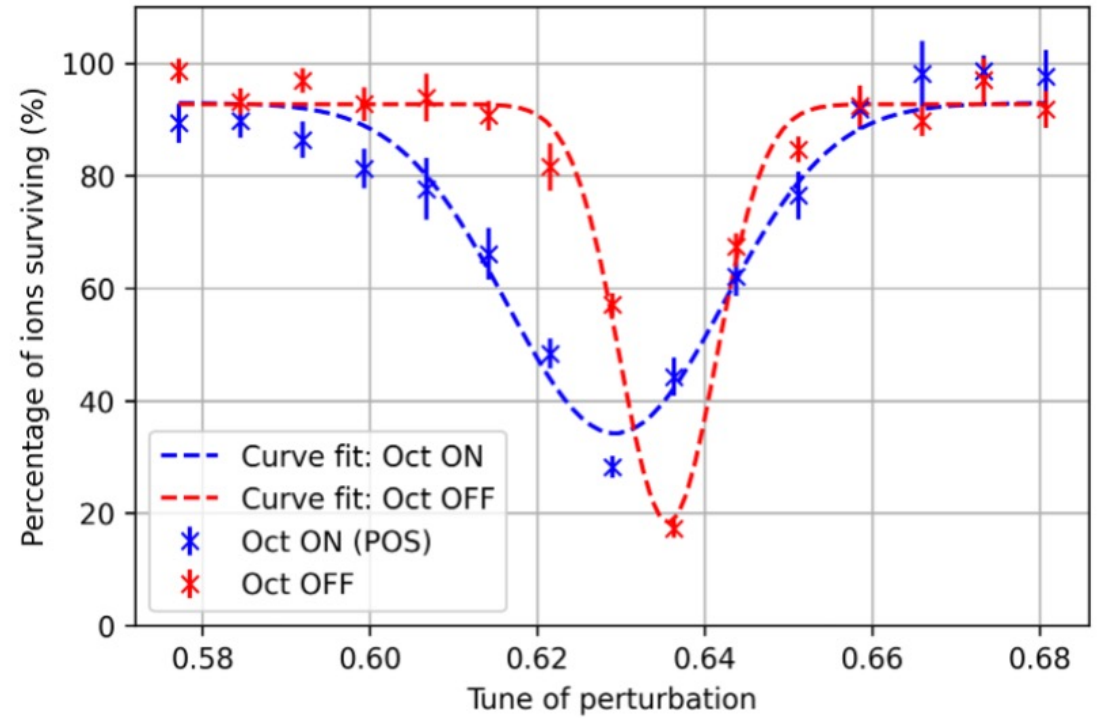
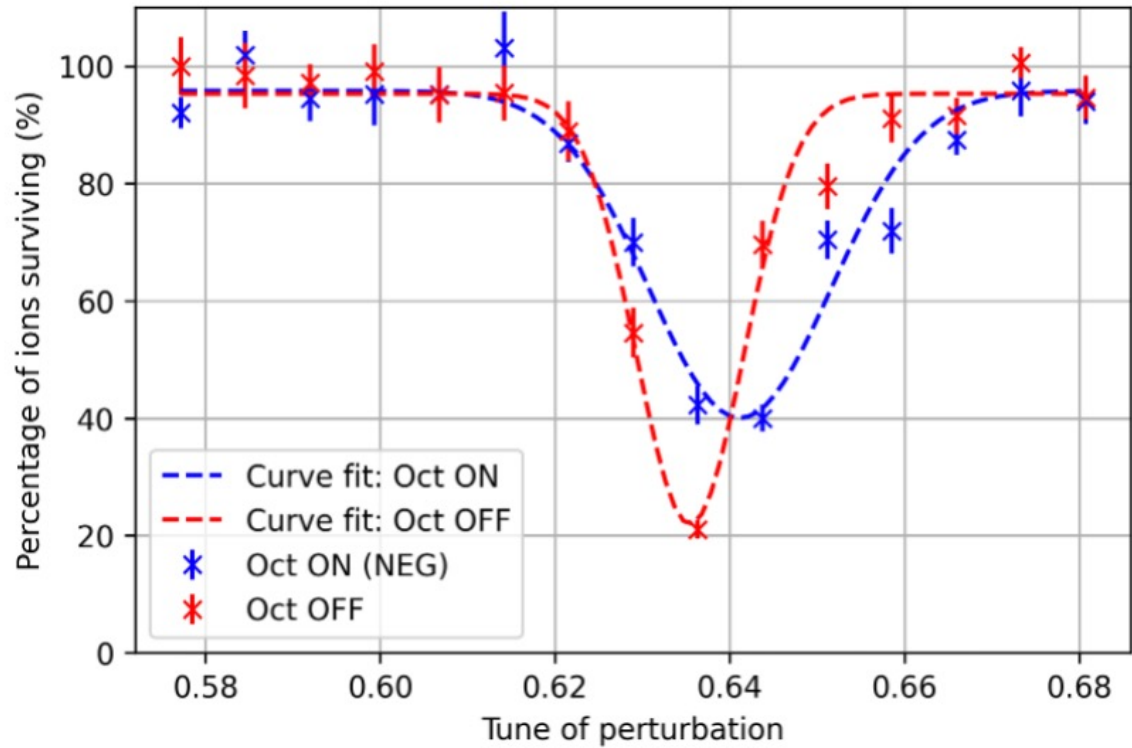
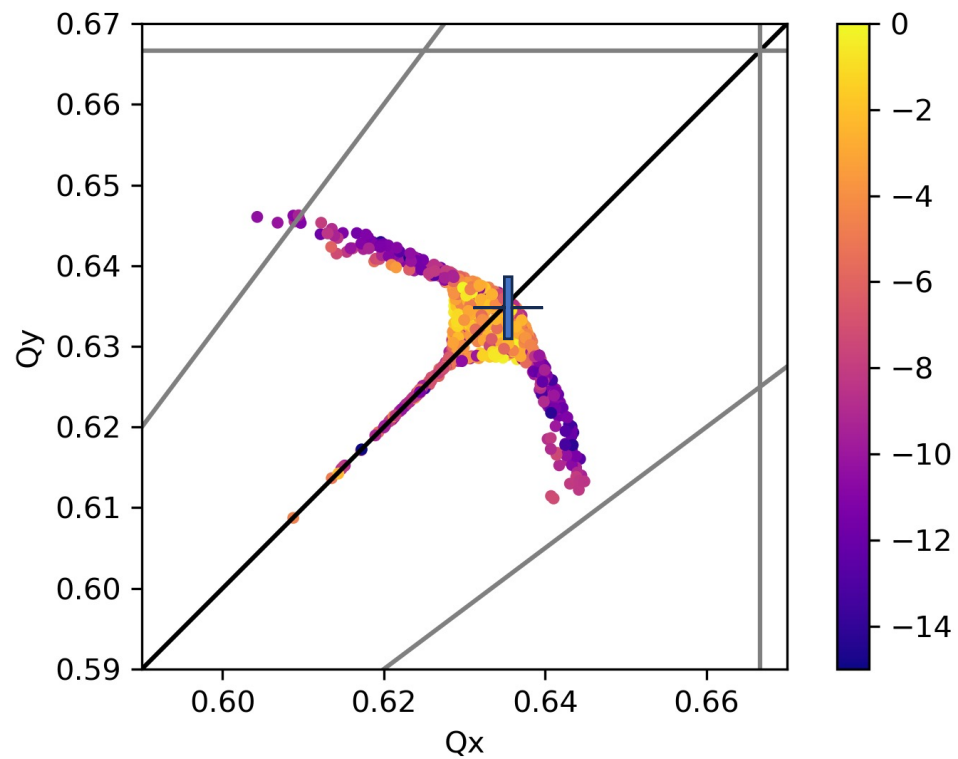
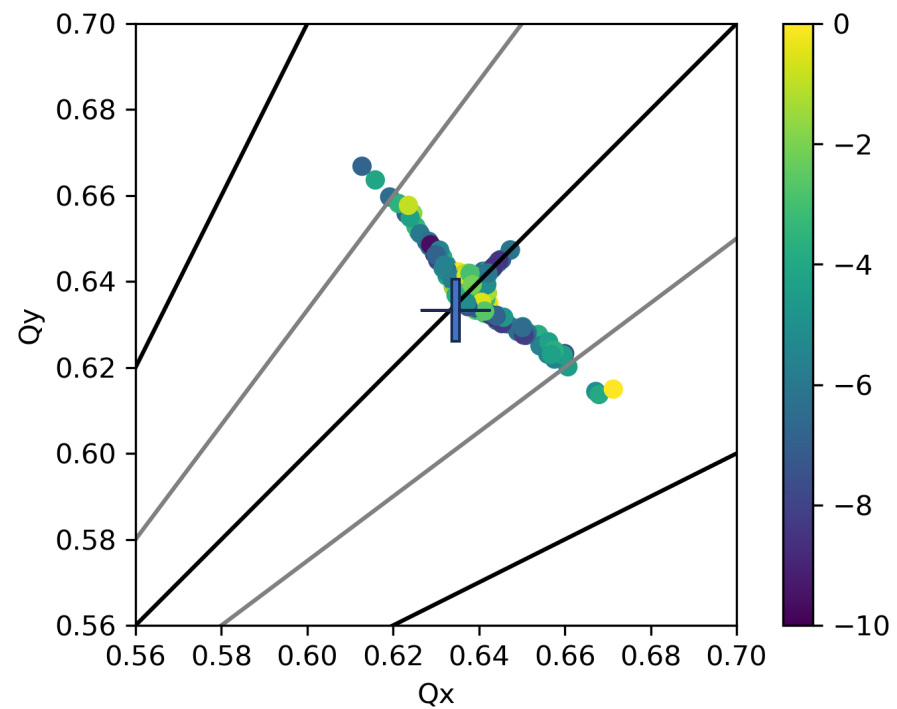


Figure 6.3: Tune scan of the 4th order perturbation applied over 5000 cells of the One-cell T-insert lattice. Percentage of ions surviving is plotted for QI octupoles turned on and off in the drift region. (Top) Negative octupole, $t = -0.6$, $V_{\text{Plates}} = -302$ V. (Bottom) Positive octupole, $t = +0.6$, $V_{\text{Plates}} = +302$ V.

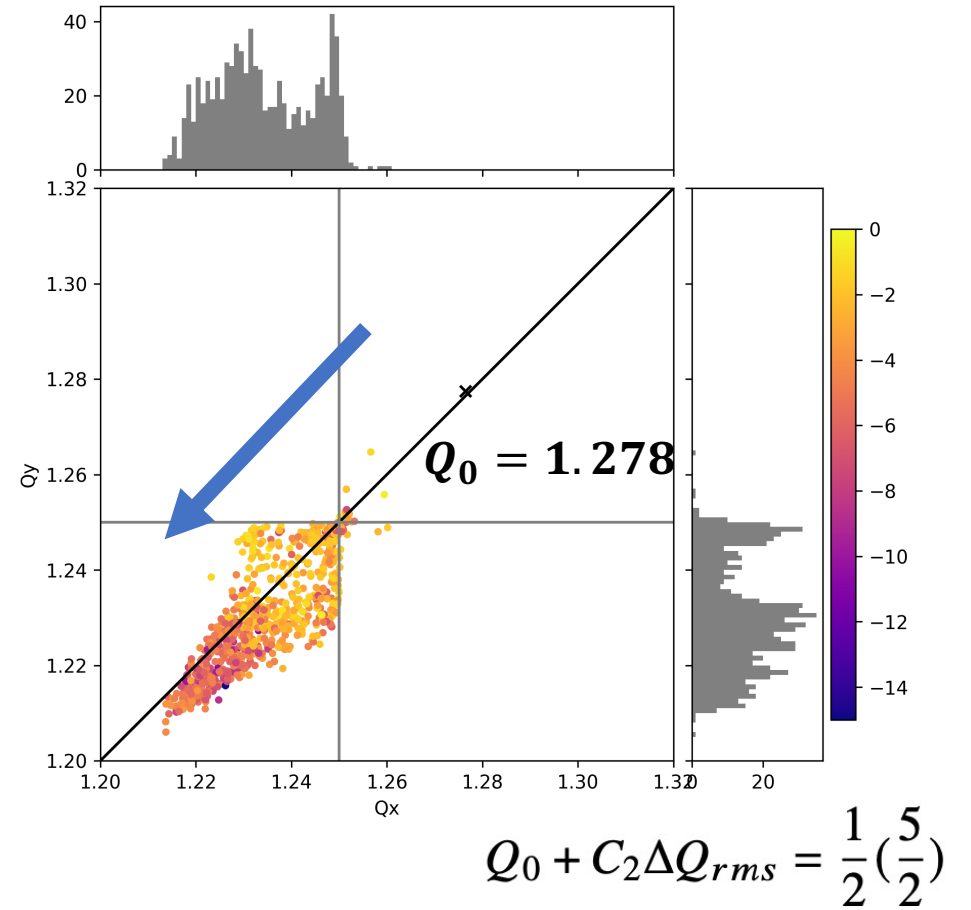
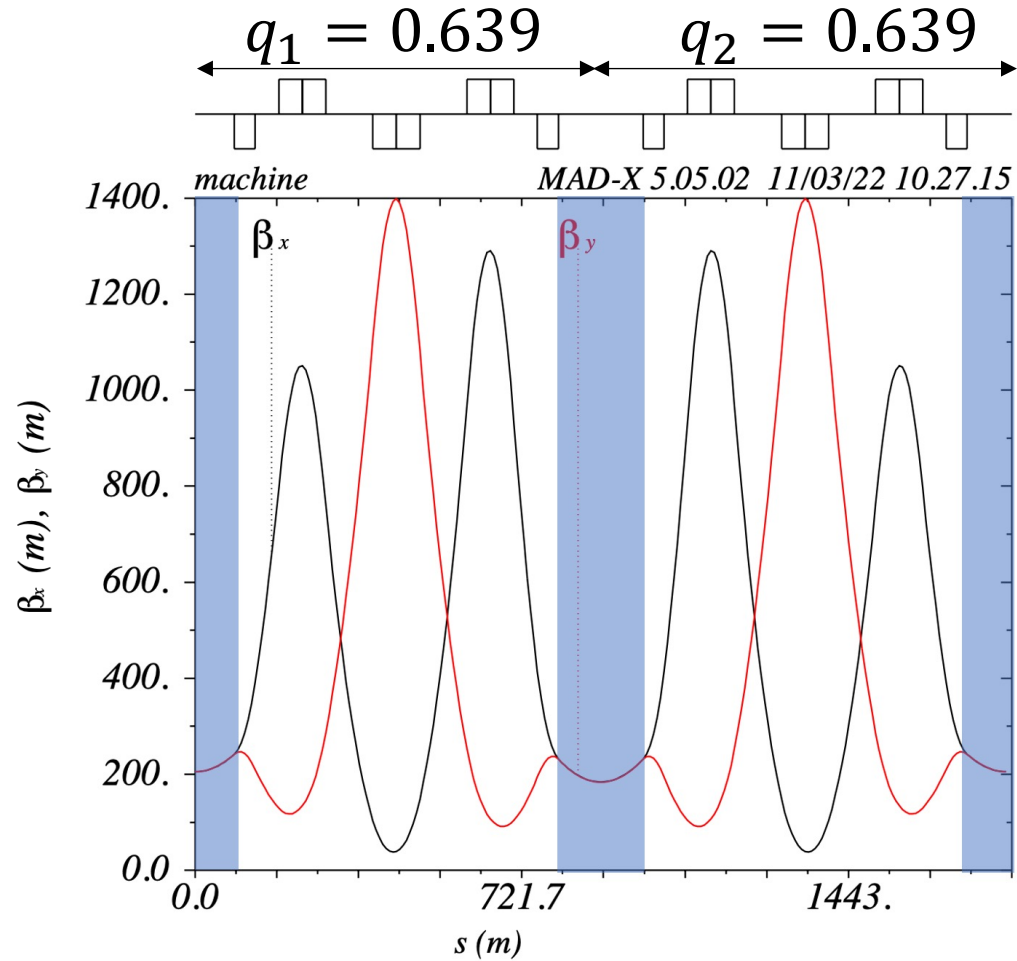
Negative octupole



Positive octupole



T-insert to excite coherent resonance



T-insert to excite coherent resonance

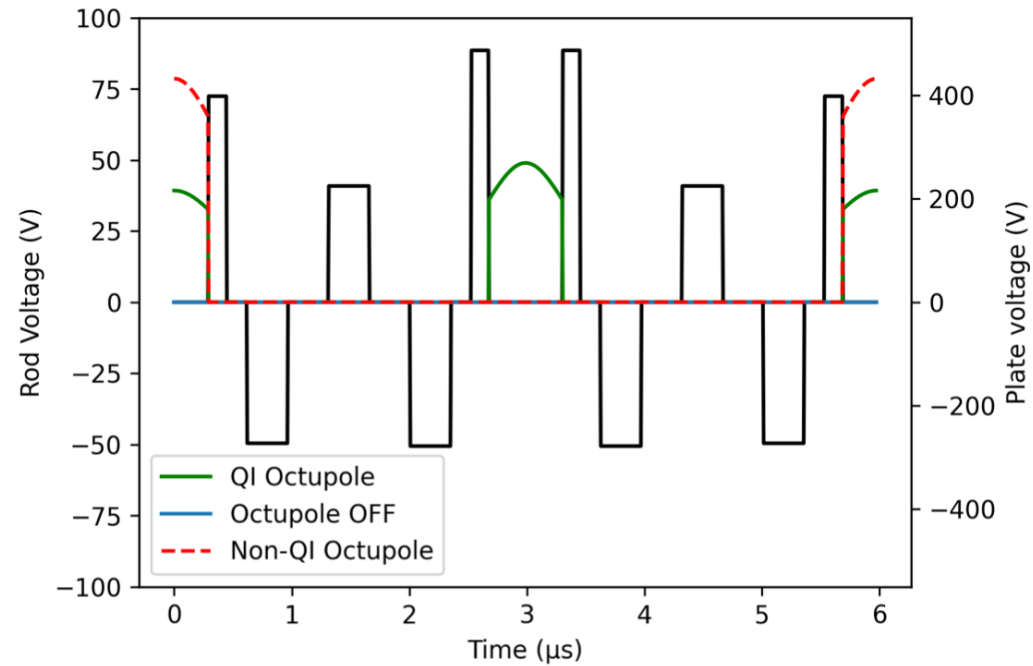
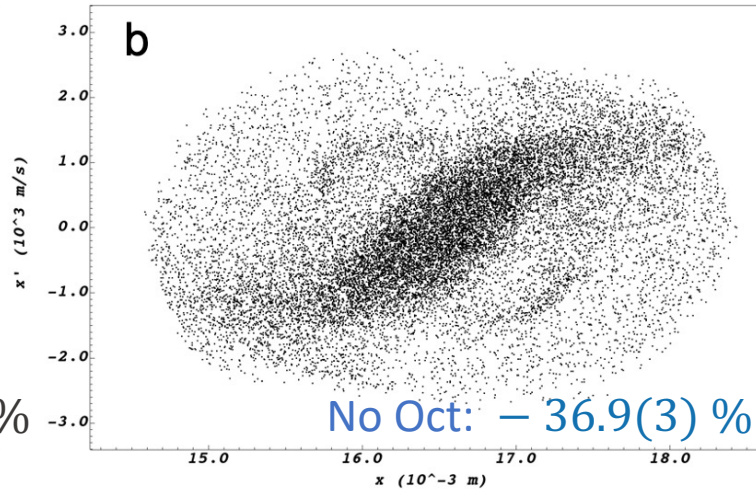
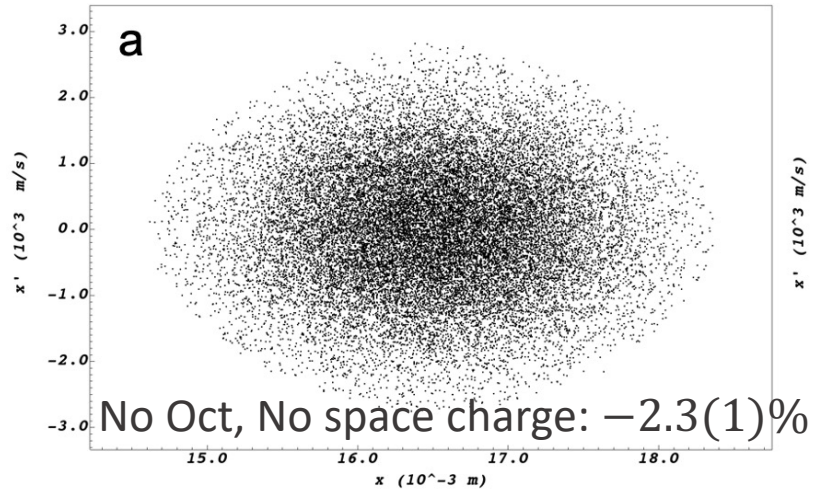
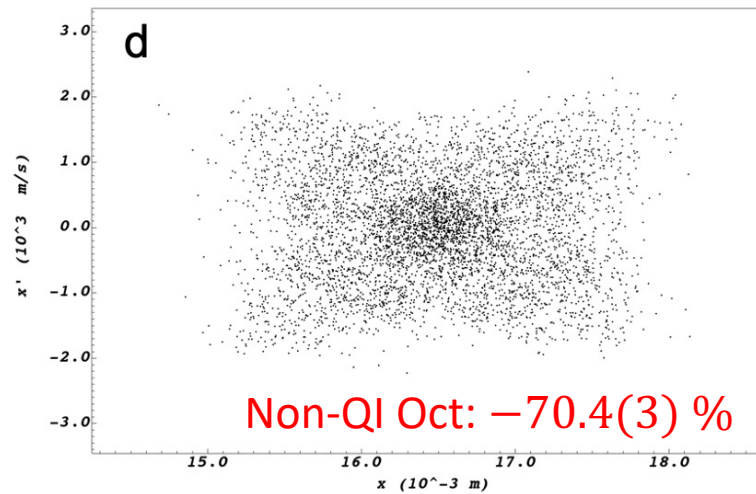
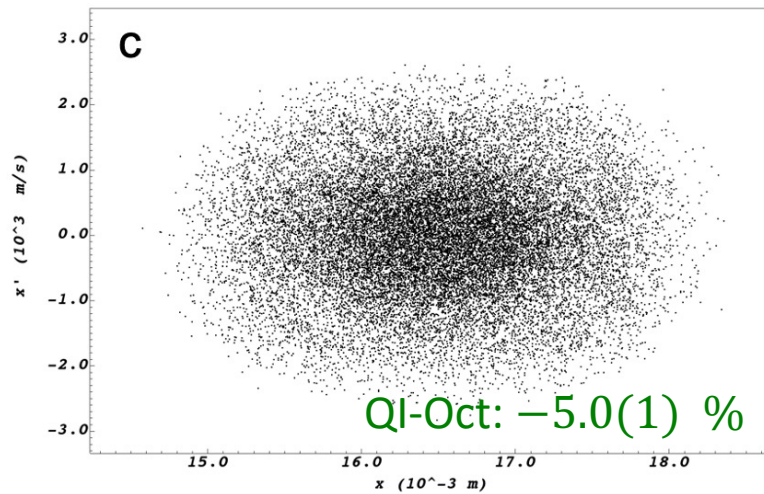


Figure 5.18: Voltage waveform applied to the rods in IBEX (black) to create the two-cell T-insert super-period. Coloured waveforms indicate the voltage applied to the plates. **Blue:** No octupoles applied in the drift region. **Green:** Octupole pulse with $1/\beta^3$ strength scaling applied in the drift region to create Quasi-Integrable lattice. **Red (dashed):** Octupole pulse with $1/\beta^3$ strength scaling with twice the strength but applied only once per super-period, hence non-integrable.

QI lattice dampens 2nd order coherent resonance



$$Q_0 + C_2 \Delta Q_{rms} = \frac{1}{2} \left(\frac{5}{2} \right)$$



$$Q_0 + \Delta Q_{rms} = \frac{5}{4}$$

Intensity scan (Sim.)

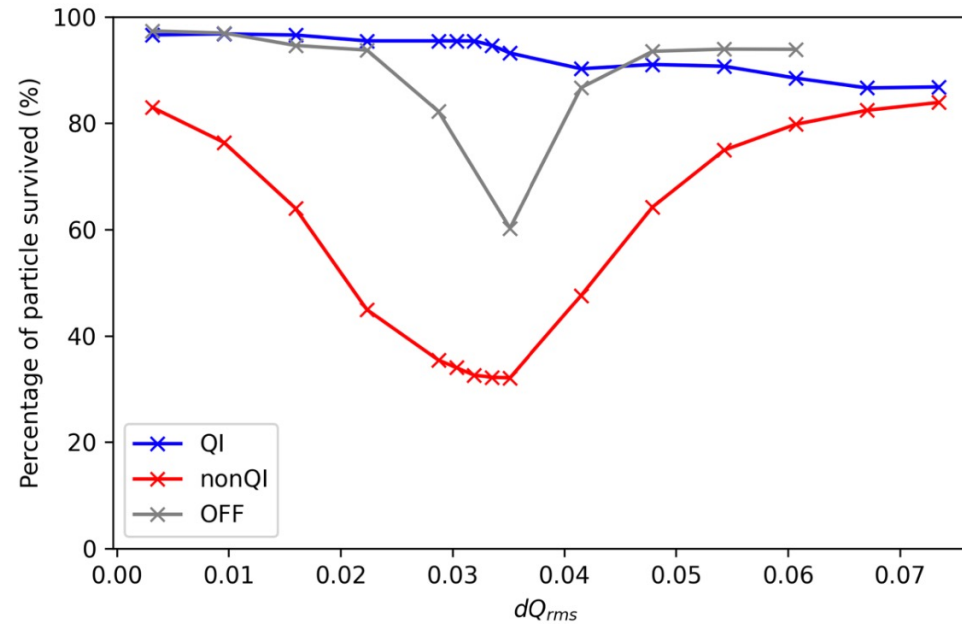
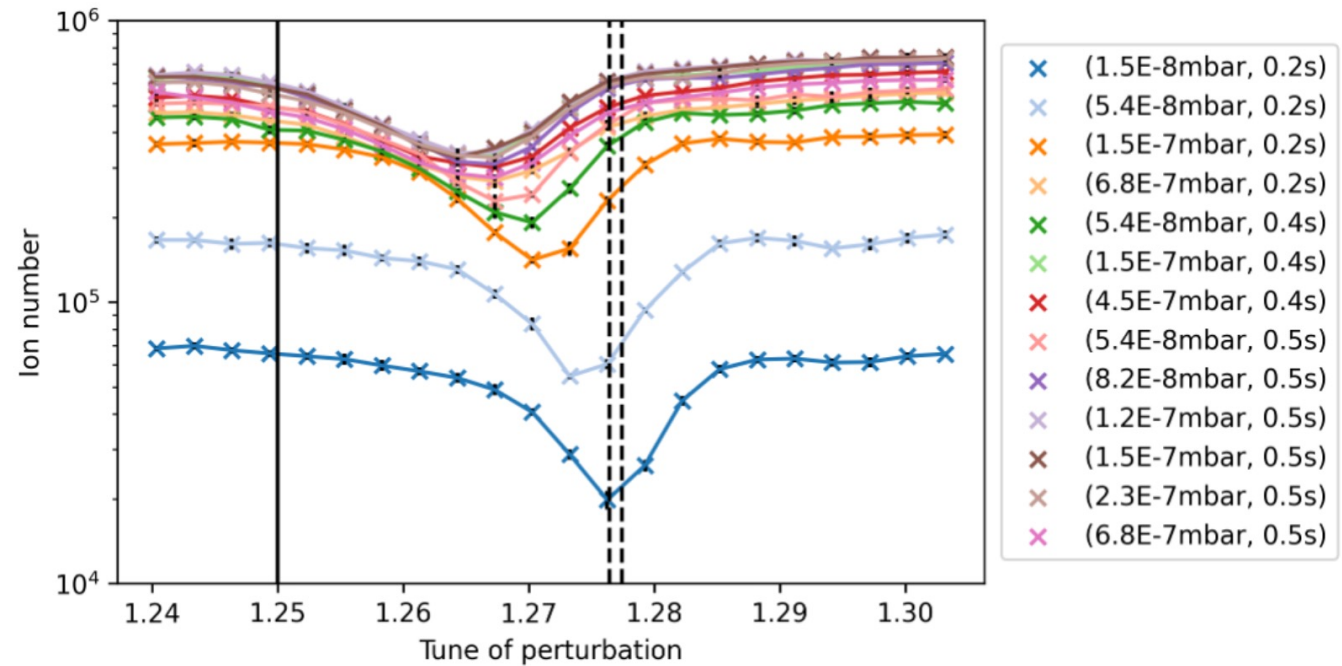
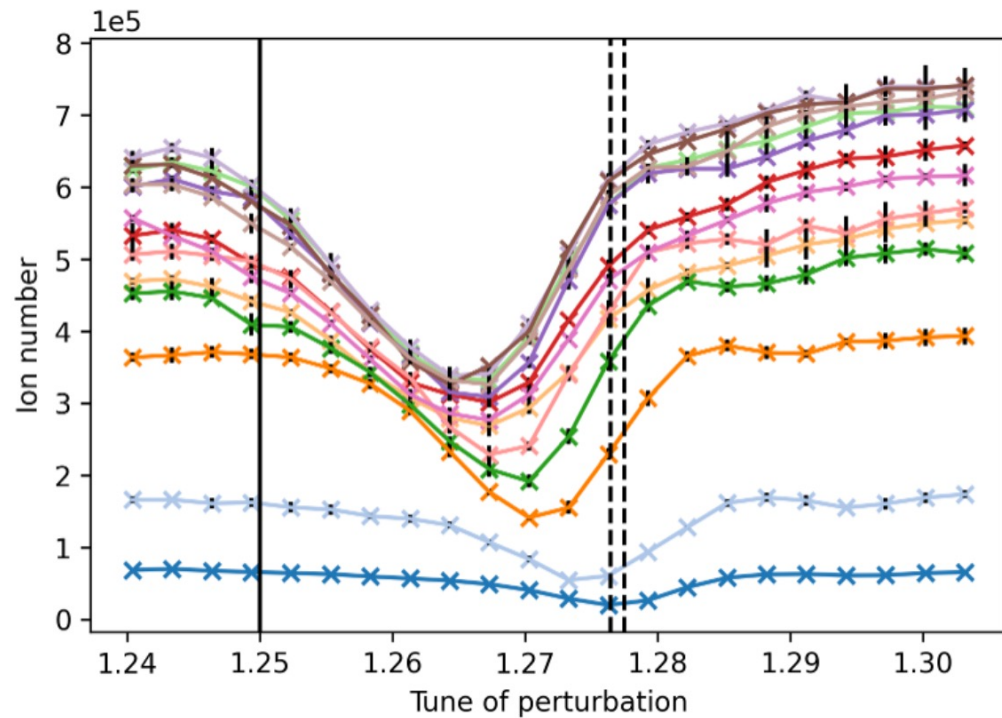
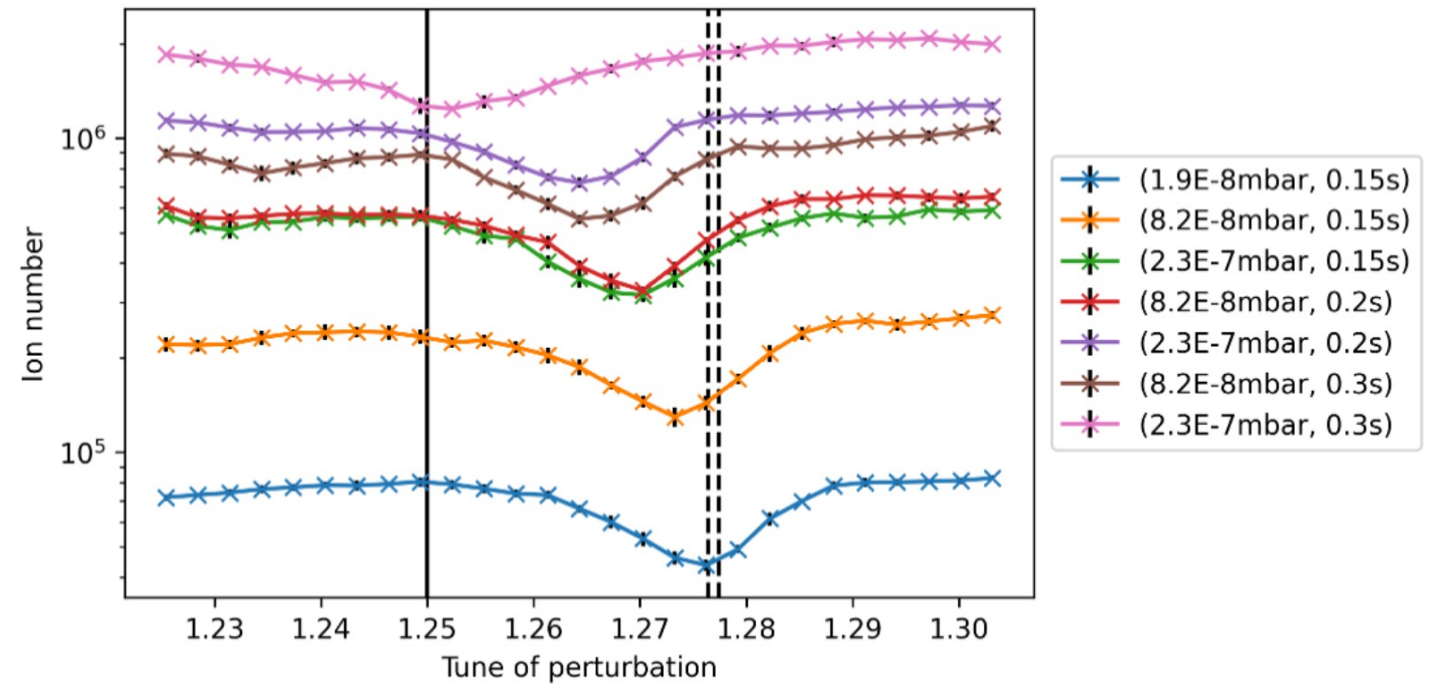
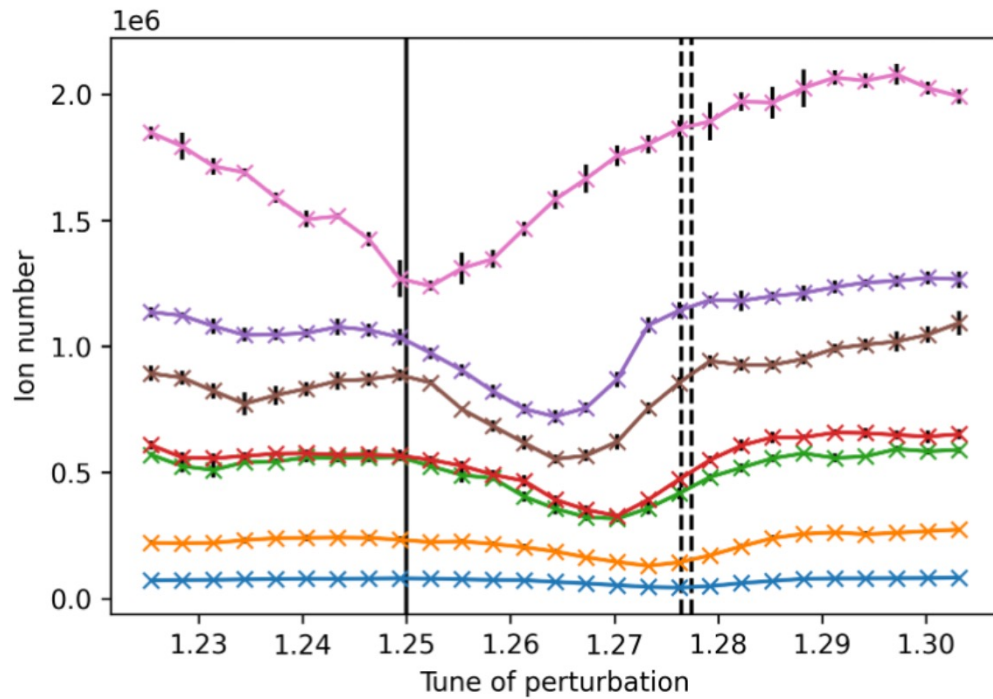


Figure 5.23: Percentage of particles surviving 650 T-insert super-periods plotted against RMS space charge tune shift, ΔQ_{rms} for an initial Gaussian distribution. Quasi-Integrable lattice (blue), linear T-insert with octupoles turned off (grey) and non-Quasi-Integrable lattice (red).

Perturbation scan – 2000 super-cells (Exp.)

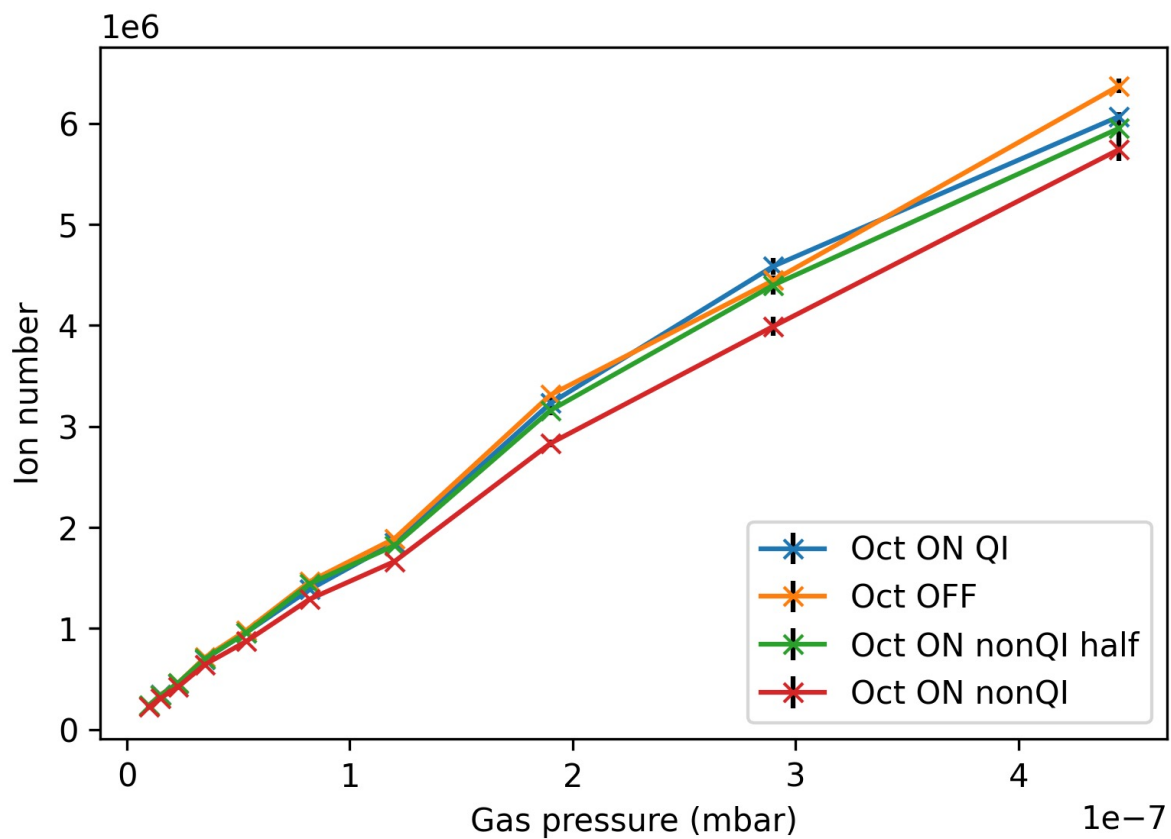


Perturbation scan – 200 super-cells (Exp.)

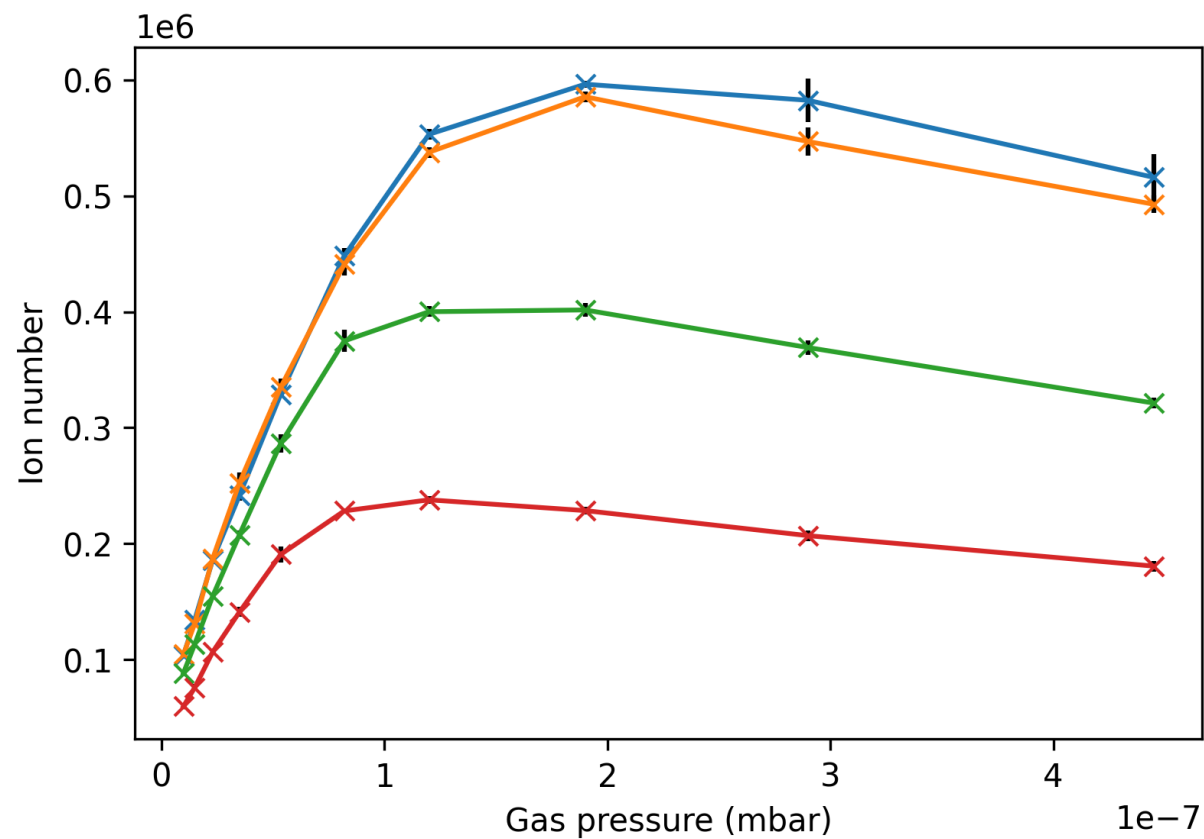


Intensity scan (Exp.)

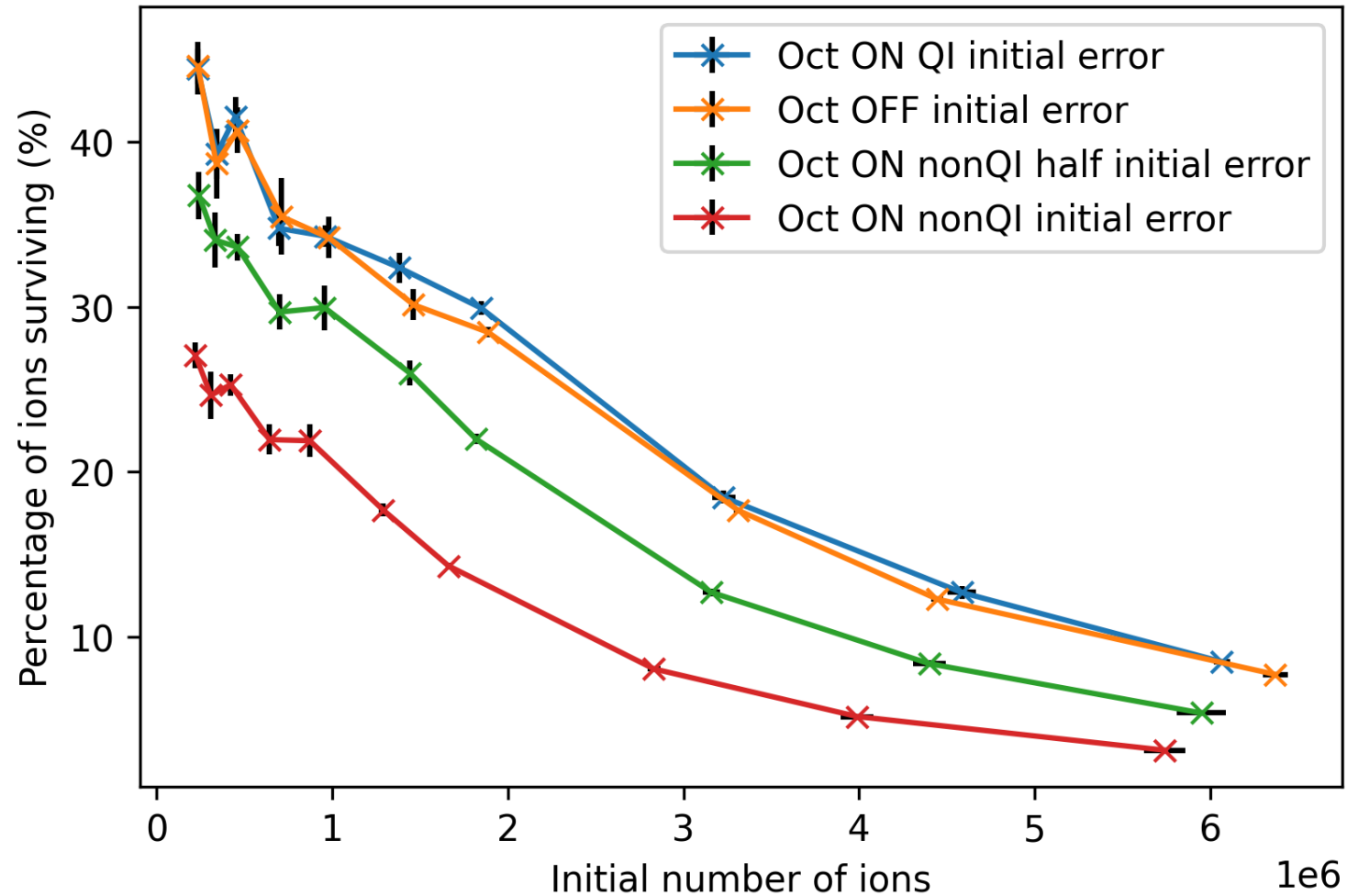
10 Cells



2000 Cells

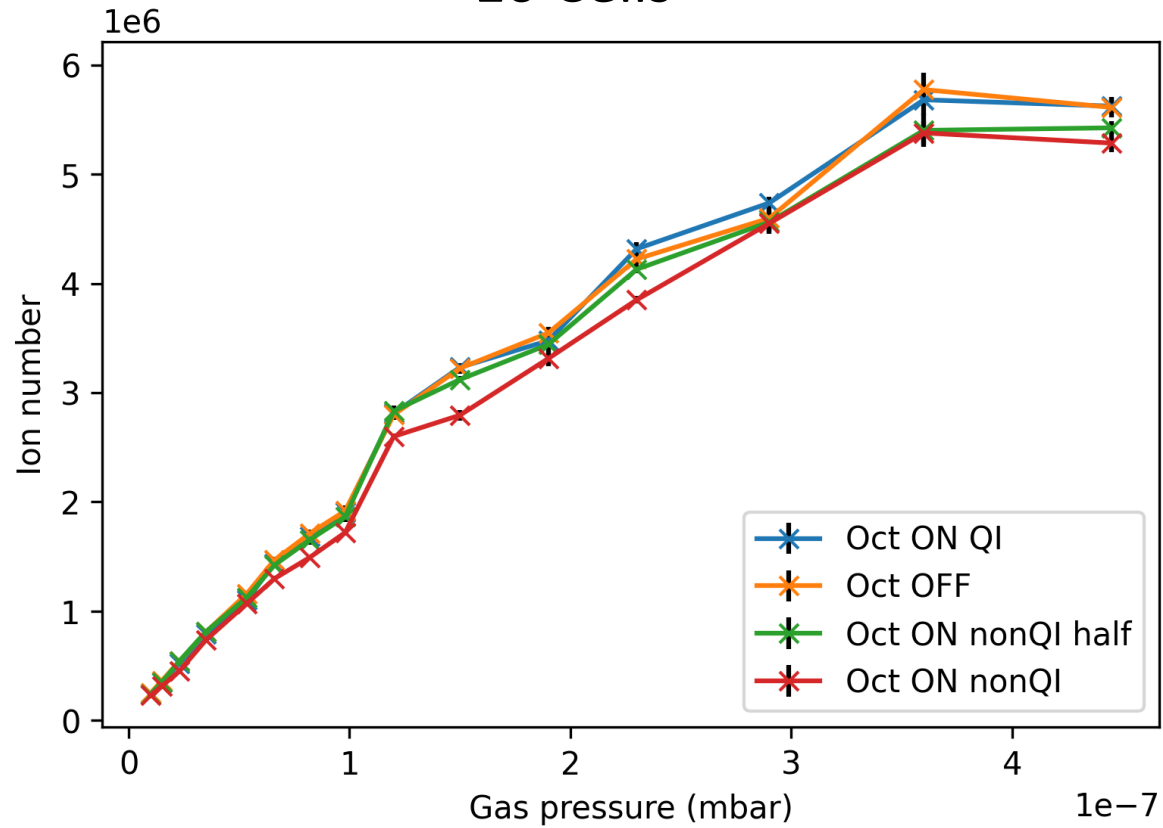


Intensity Scan 2000 cells (Exp.)

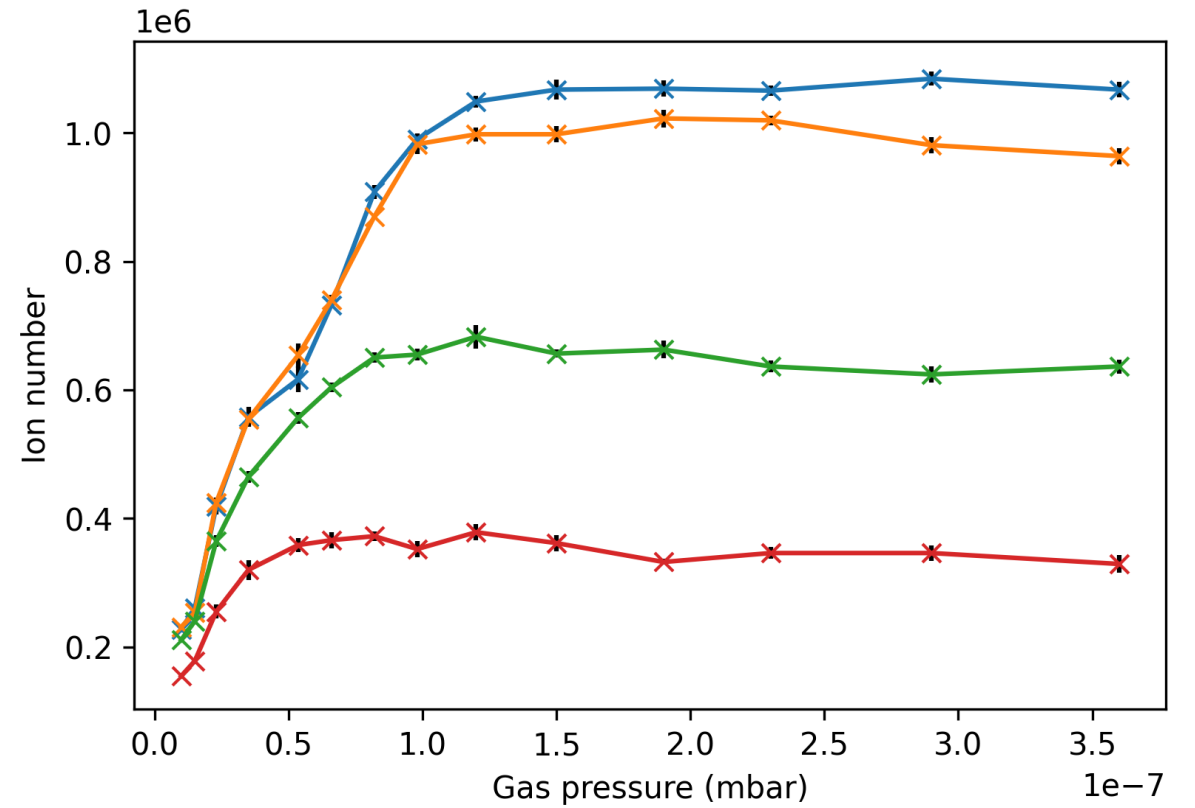


Intensity scan (Exp.)

10 Cells



1000 Cells



Intensity Scan 1000 cells (Exp.)

