

Design of a radiofrequency trap - Tutorial on RF traps – Martina Knoop

Everybody should come with her or his favorite spectroscopy experiment: you should know: what do you want to measure? To what precision? What is your ion? Its wavelengths? The corresponding linewidths? How many ions do you need? What is the expected Signal-to-Noise ratio? Any special environmental requirements (no B-field, no BBR, short-lived nuclides, ...?)

We will step through the following issues to determine

- which ion to choose
- the dimension of your trap (size, scalability, ease of use, ..)
- the trapping parameters of your trap (how to calculate a , q ?)
- how to set the external environment (vacuum vessel, pump, residual fields, installation, air condition)
- what will be in your vessel (ion creation, electronic detection, filtering)
- the choice of your laser (cooling, fluorescence, photoionization, repumping)
- how to detect the ion's fluorescence (optical design, instrument, efficiency, ..)
- ...