

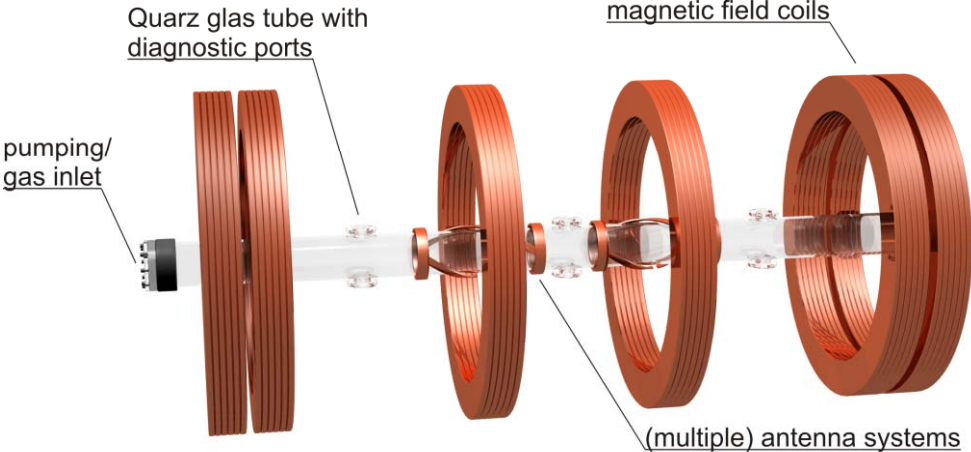


Helicon Plasma Cell

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- status of the experiment / progress
- project overview (timeline/problems)

scheme:



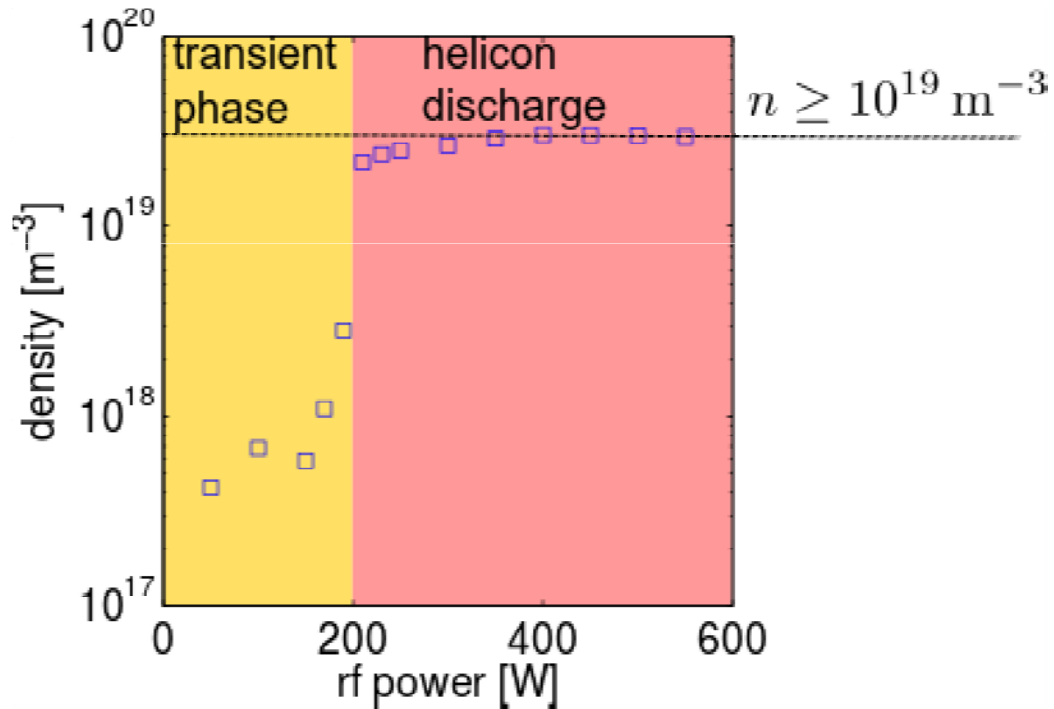
- layout of prototyp finalized
- reliable low-power ($\leq 3\text{kW}$) operation
- helicon discharge achieved in a number of gases (H,He,Ar)
 - ⇒ required power for helicon discharge depends on gas species (as expected)

helicon discharge in 1m prototyp cell:

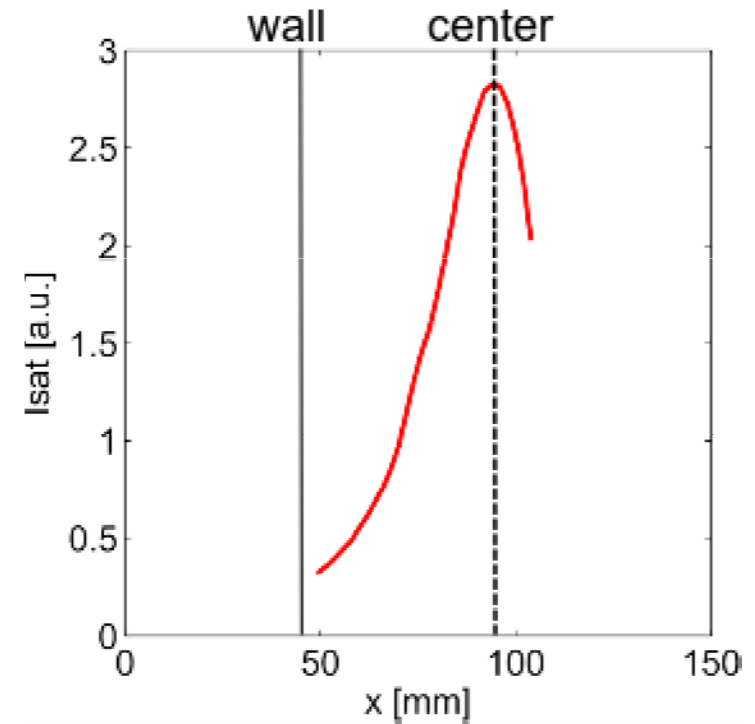




density vs. rf power



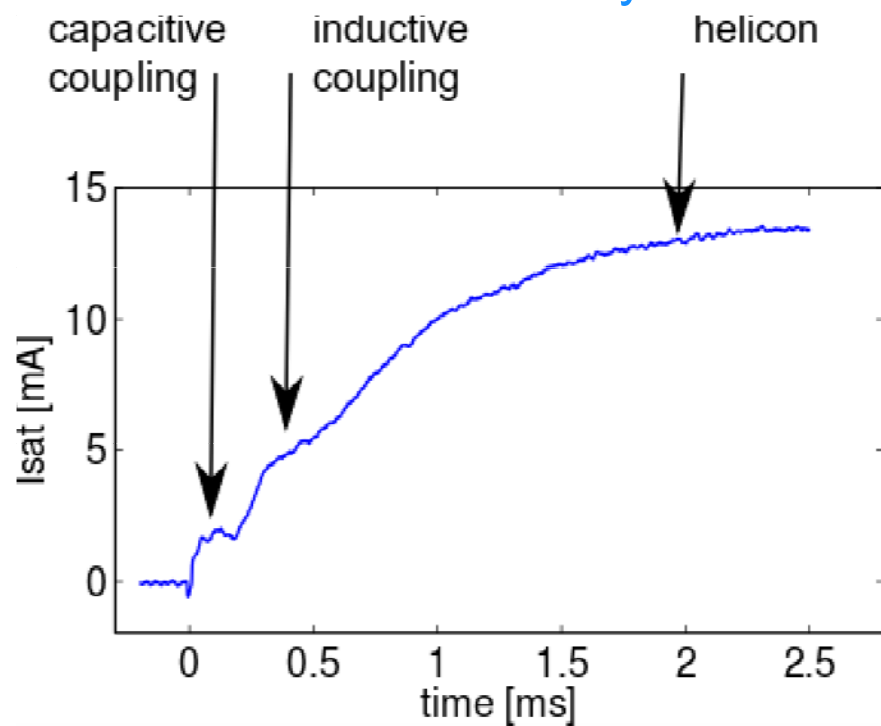
radial density profile



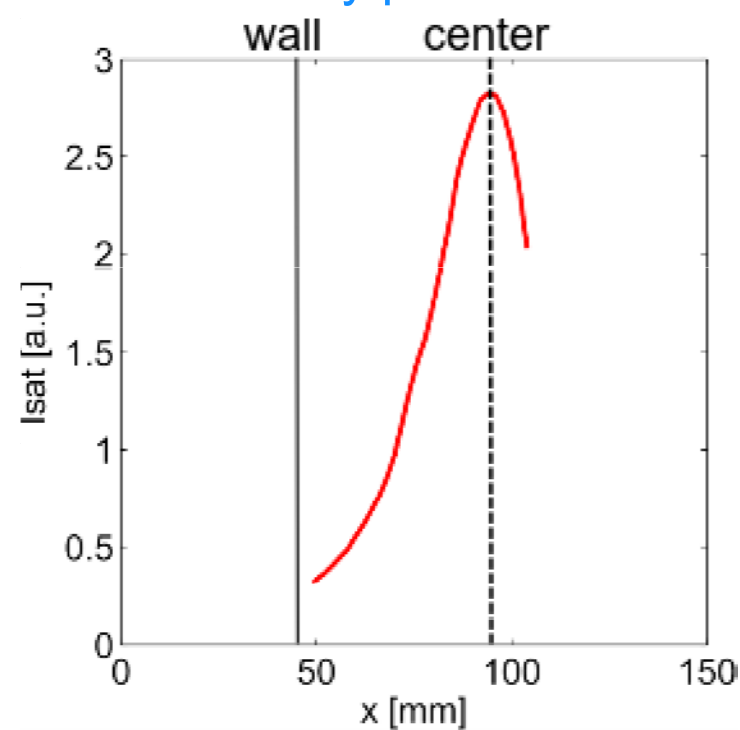
- helicon discharge already at low rf-power (200W)
- stable (cw) helicon discharge with $n \approx 10^{19} \text{ m}^{-3}$ @ $P_{\text{rf}} = 500 \text{ W}$
- radial profile peaked in the center



time-resolved central density



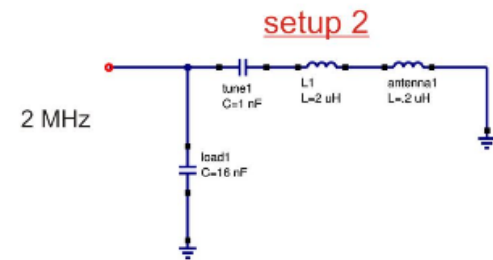
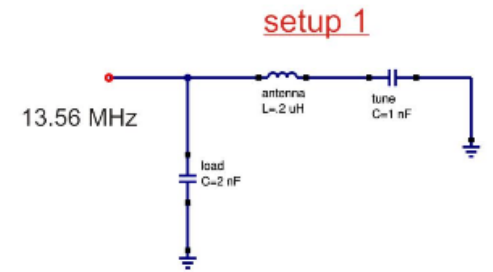
radial density profile



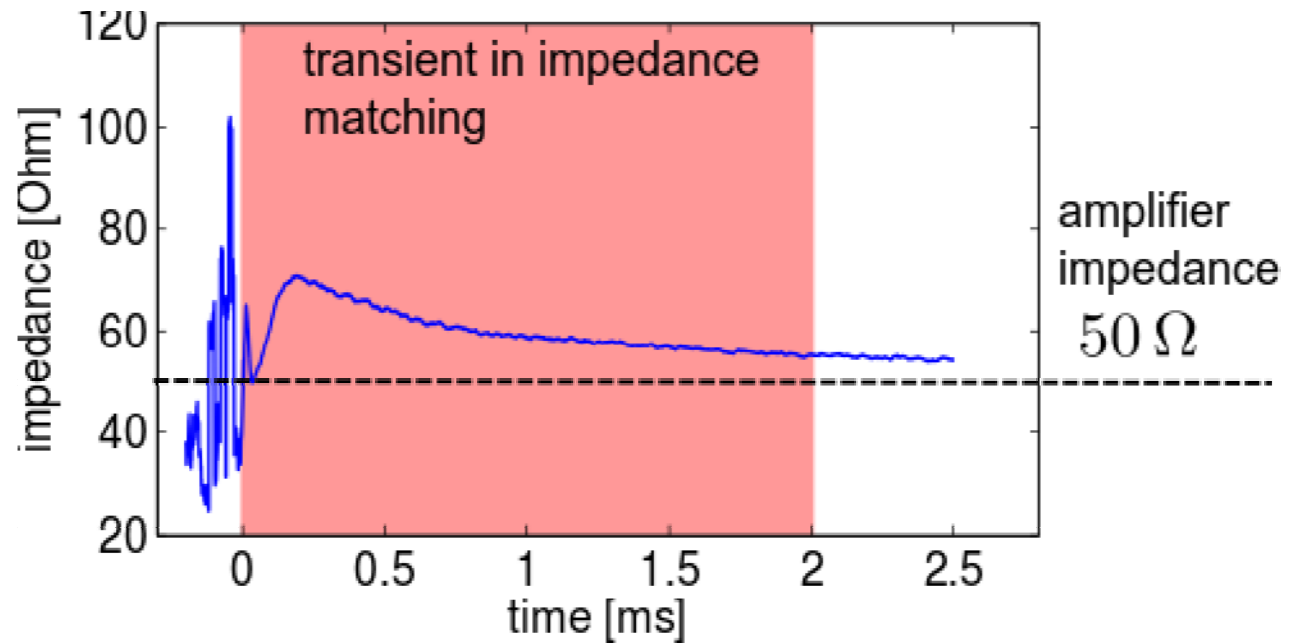
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- radial profile peaked in the center
- in transition phase mode jumps capacitive \Leftrightarrow inductive \Leftrightarrow helicon clearly observed



- helicon discharge achieved in rf frequency range $f=2-14\text{MHz}$
- impedance matching scheme differs significantly

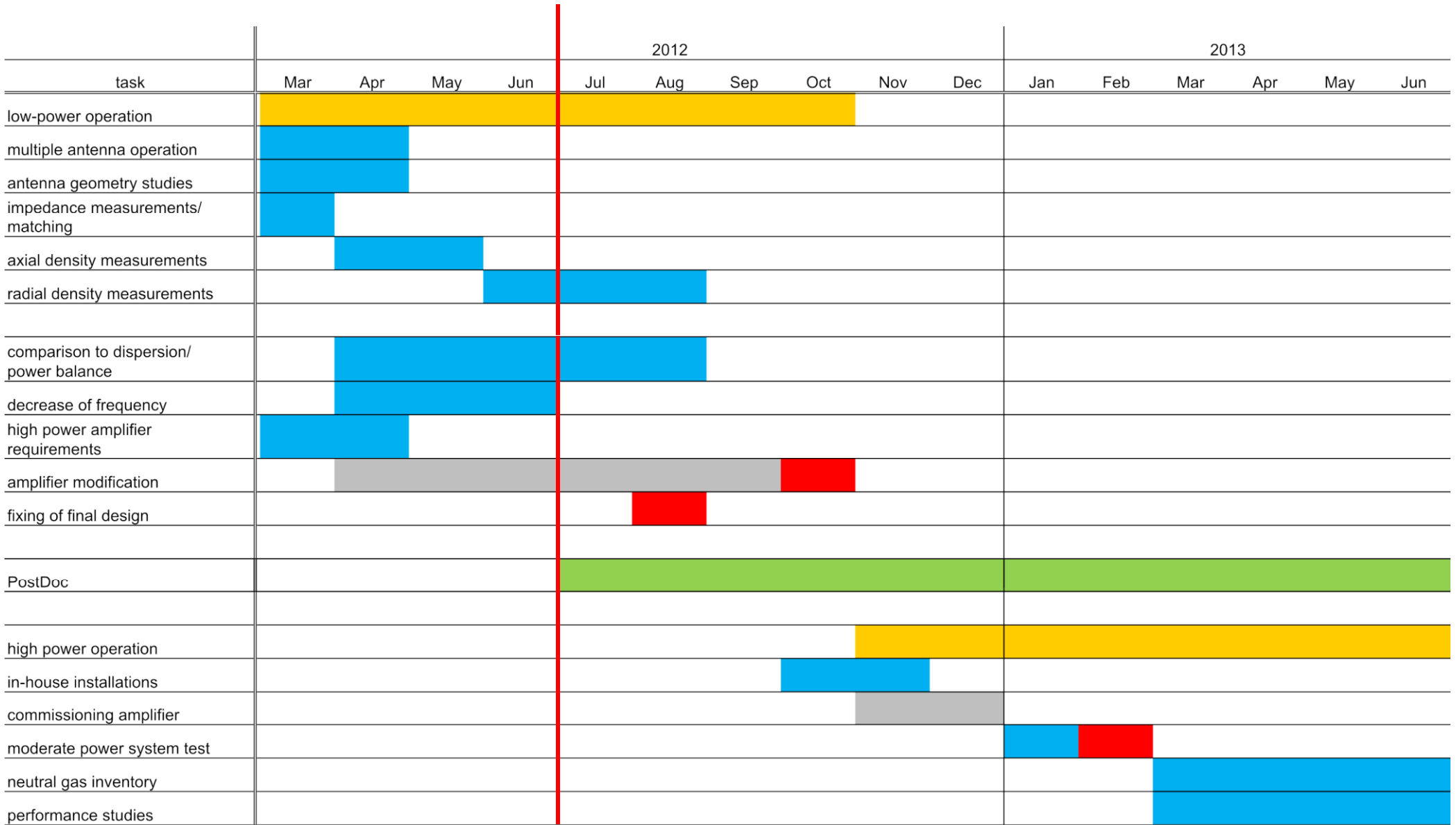


- transient phase of impedance matching requires amplifier to cope with $\sim 2\text{ms}$ of mismatch





Original Timeline



we are here



- low-power operation successful and as expected
- antenna geometry: $m=+1$ antenna way to go
- impedance matching schemes fixed for frequency range
- high-power amplifier requirements finalized
- budget on track



- multiply antenna operation still pending
- CO₂ interferometer set up, first results pending
- choice of amplifier system time-critical

⇒ lack of man power



- dedicated PostDoc will start 01. July
- technical support from rf expert group (IPP Garching) established