Status about the optics between the source and ELENA

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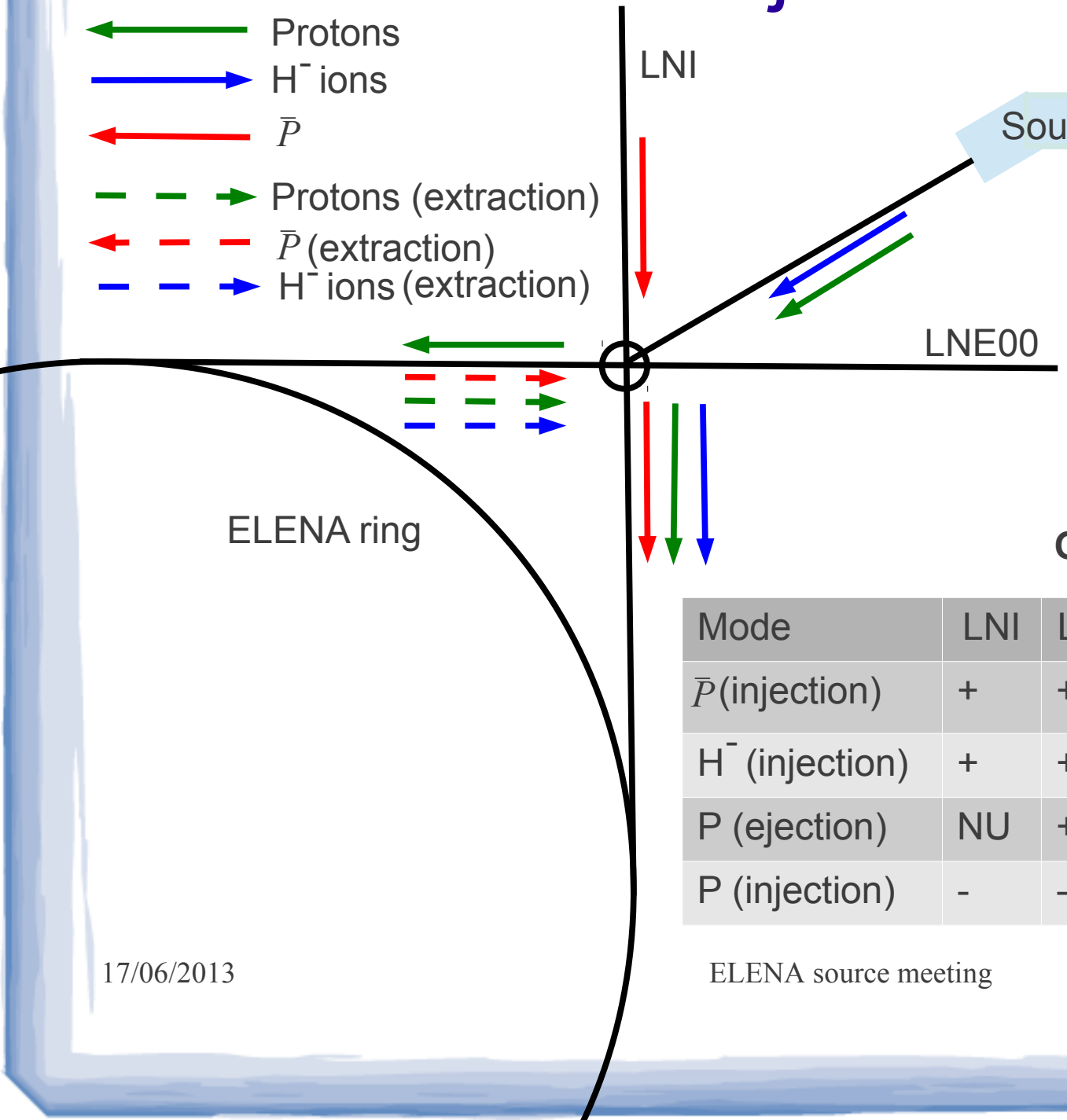
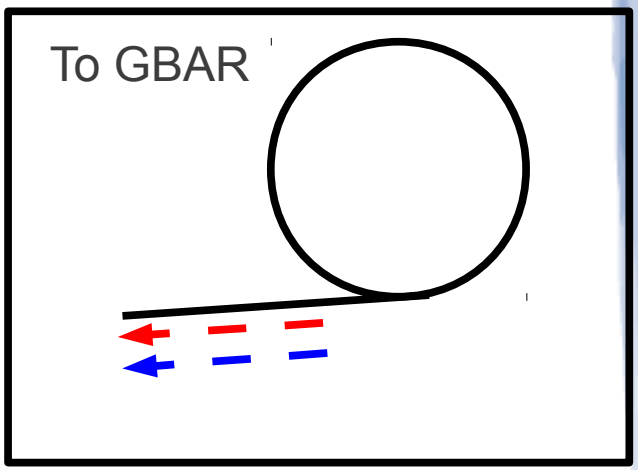
Parameters*

Parameter	**Unit**	100% I_0	90% I_0	70% I_0	37% I_0
Current	mA	0.25	0.22	0.19	0.09
ϵ_{RMS}	mm mrad	0.81	0.66	0.66	0.32
$\epsilon_{RMS\,,\,normalized}$	mm mrad	0.11	0.09	0.09	0.05
α		-11.46	-6.77	-5.86	-2.63
β	m/rad	22.98	13.46	11.91	4.93
γ	m/rad	5.76	3.48	2.97	1.61

*** Parameters provided by Ralf Gebel**

Source-Injection layout



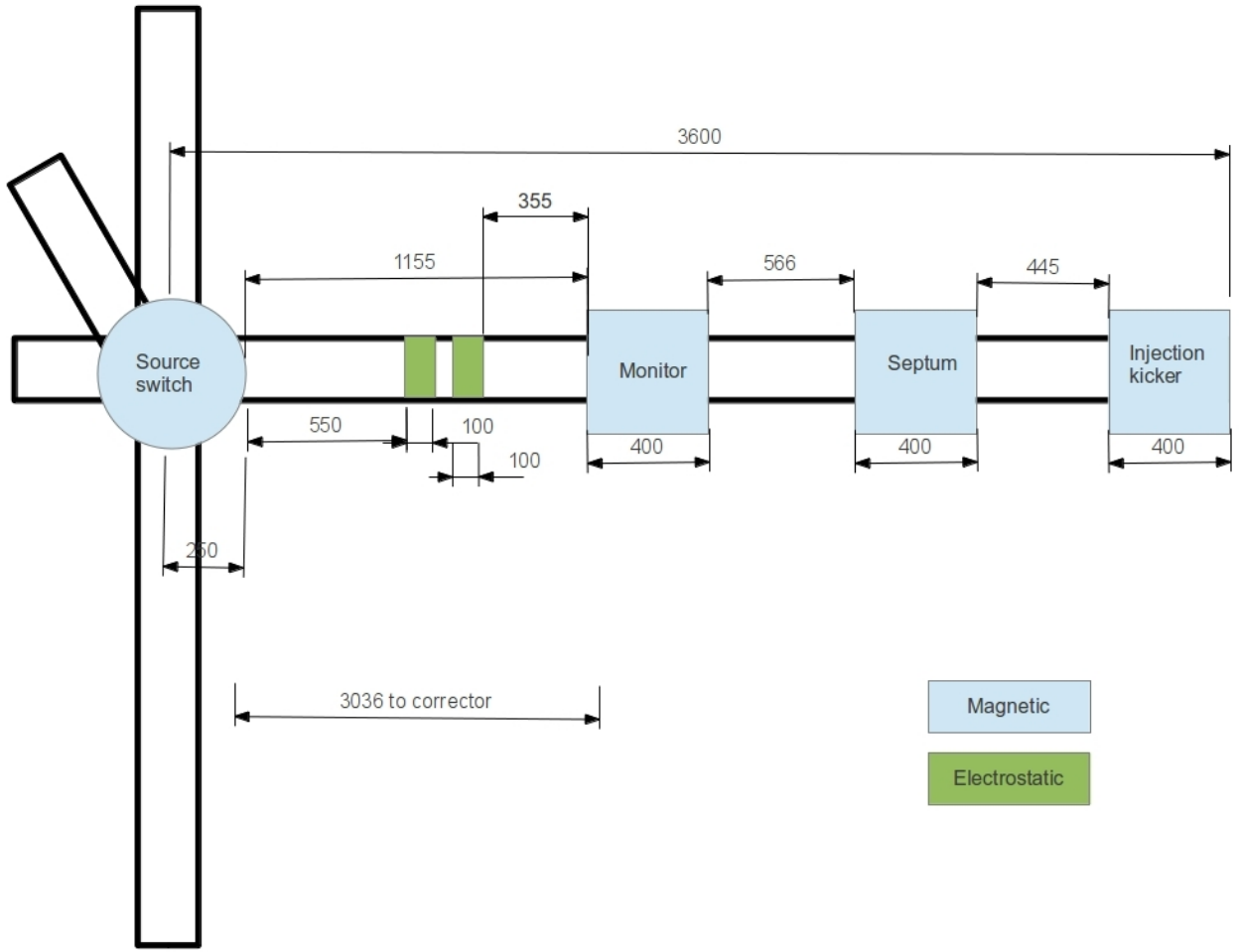


Operational mode

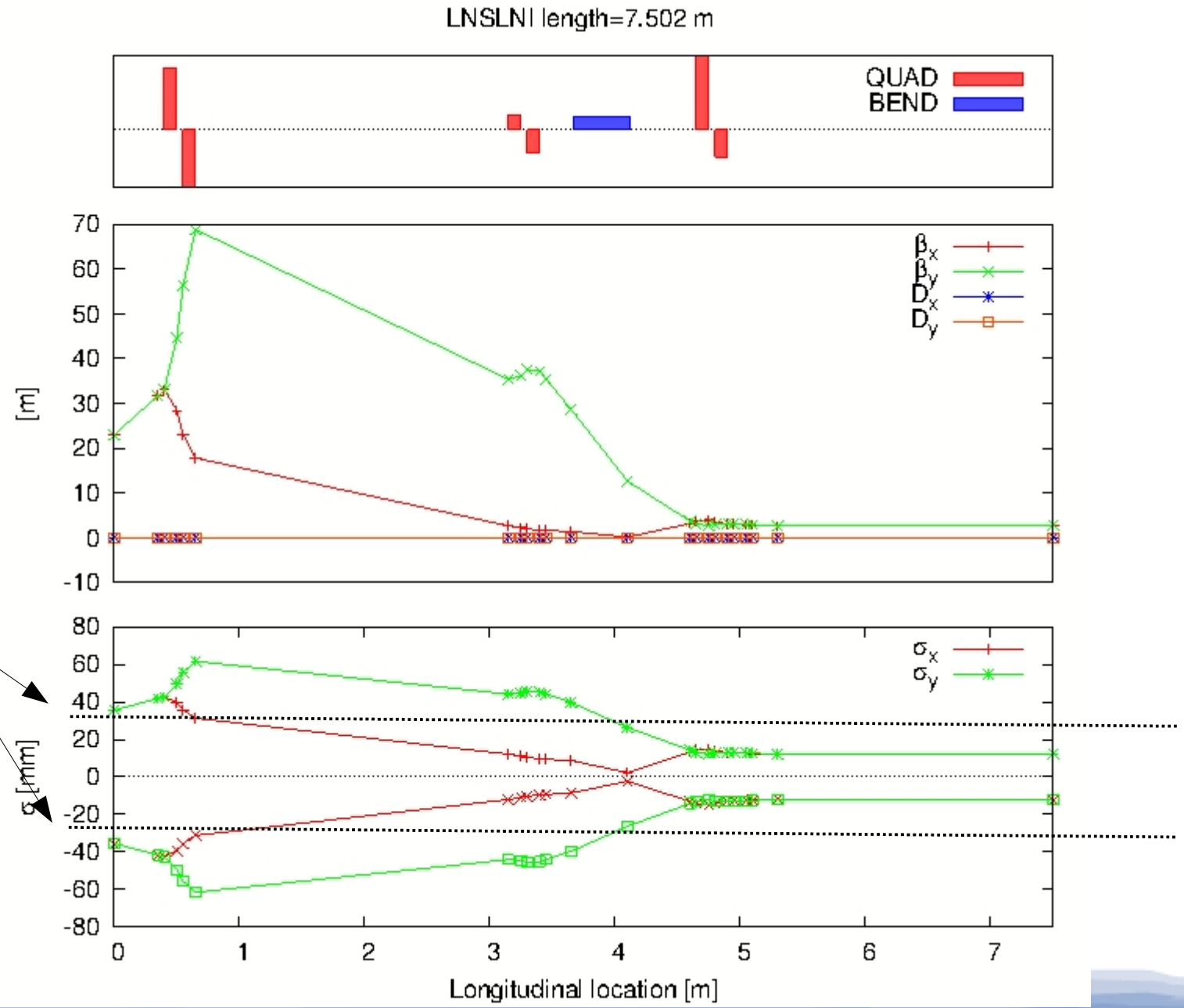
Mode	LNI	LNE_{00}	LNE_{50}	RING	Goal
$\bar{P}$(injection)	+	+	+	+	Normal operation
H^- (injection)	+	+	+	+	Cooling tests
P (ejection)	NU	+	NU	+	Optics studies
P (injection)	-	-	NU	-	Cooling tests

+ Normal polarity
- Inverse polarity
NU Not Used

Injection line

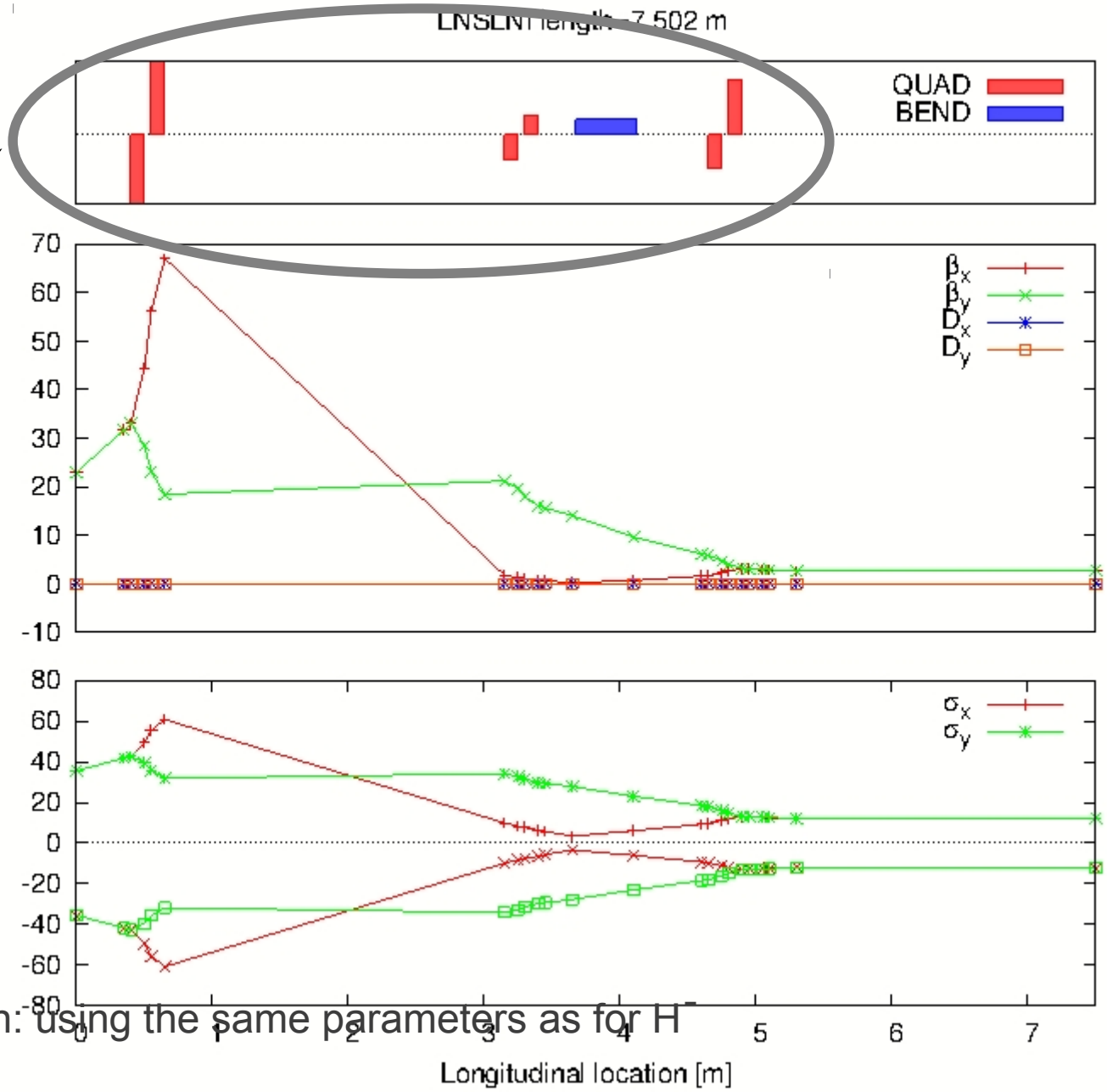


Source to injection (H^-)



Aperture limit
With current
design

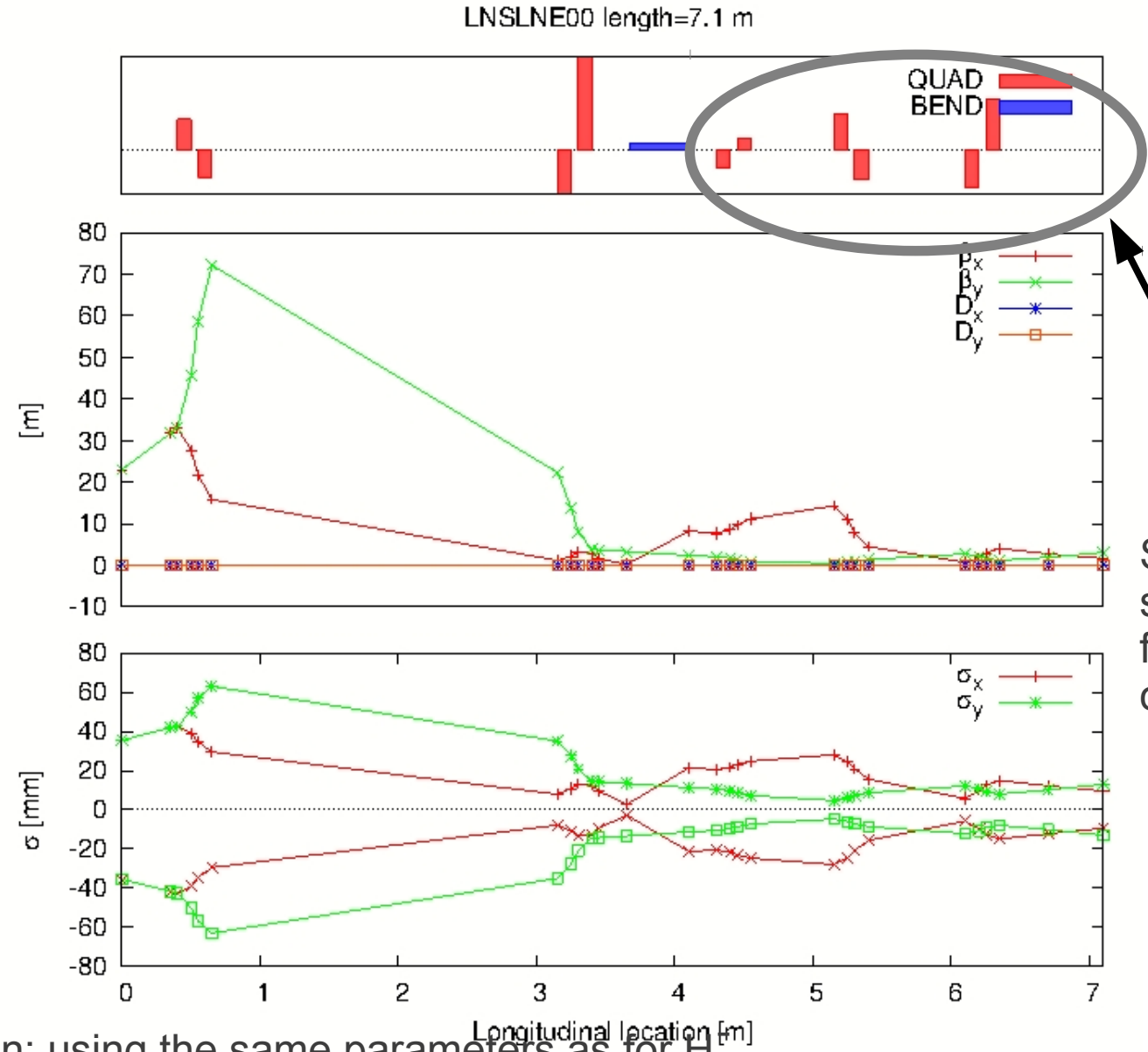
Source to injection (protons*)



Polarity swap needed

* Assumption: using the same parameters as for H⁻

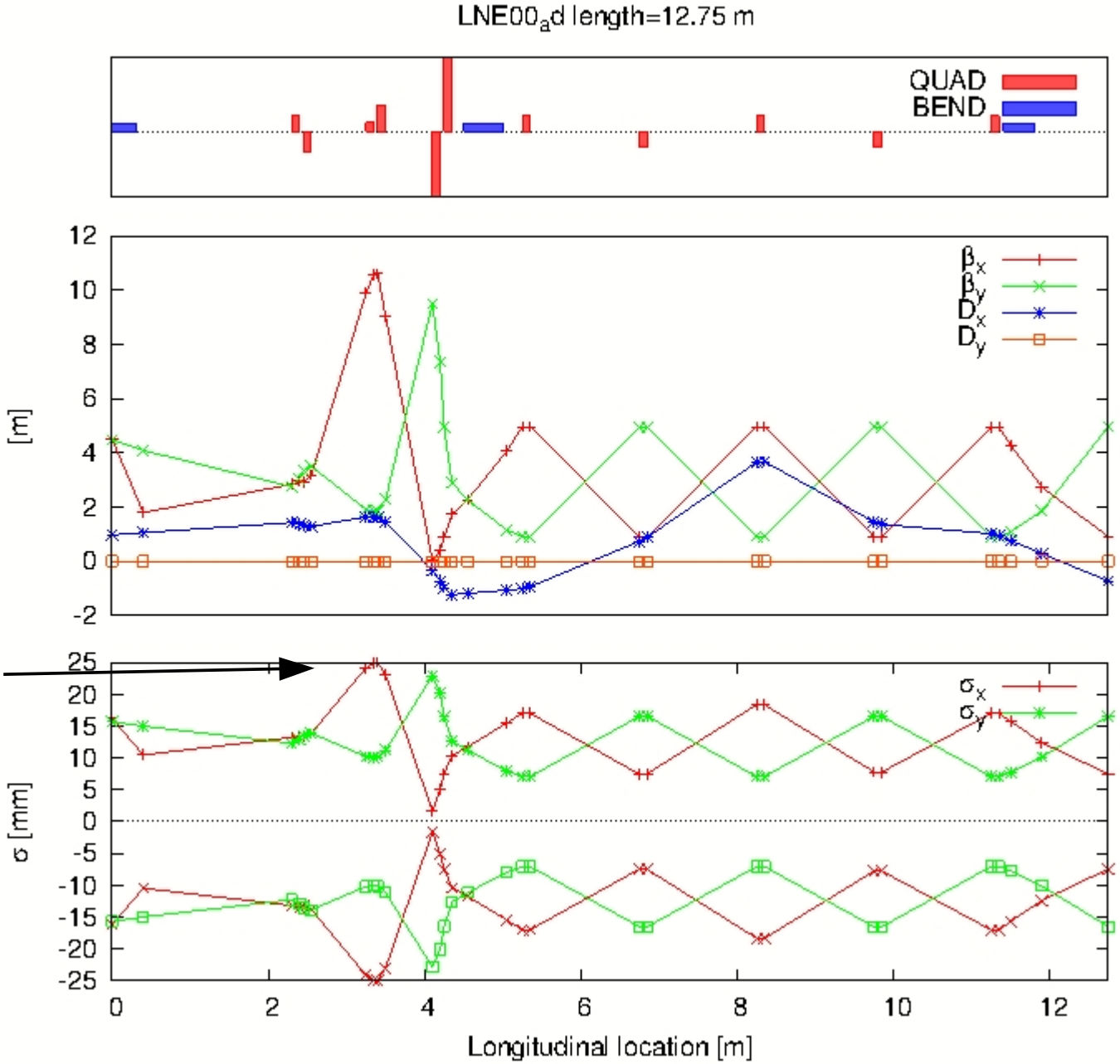
Injection to extraction (protons*)



Same strengths as for normal operation

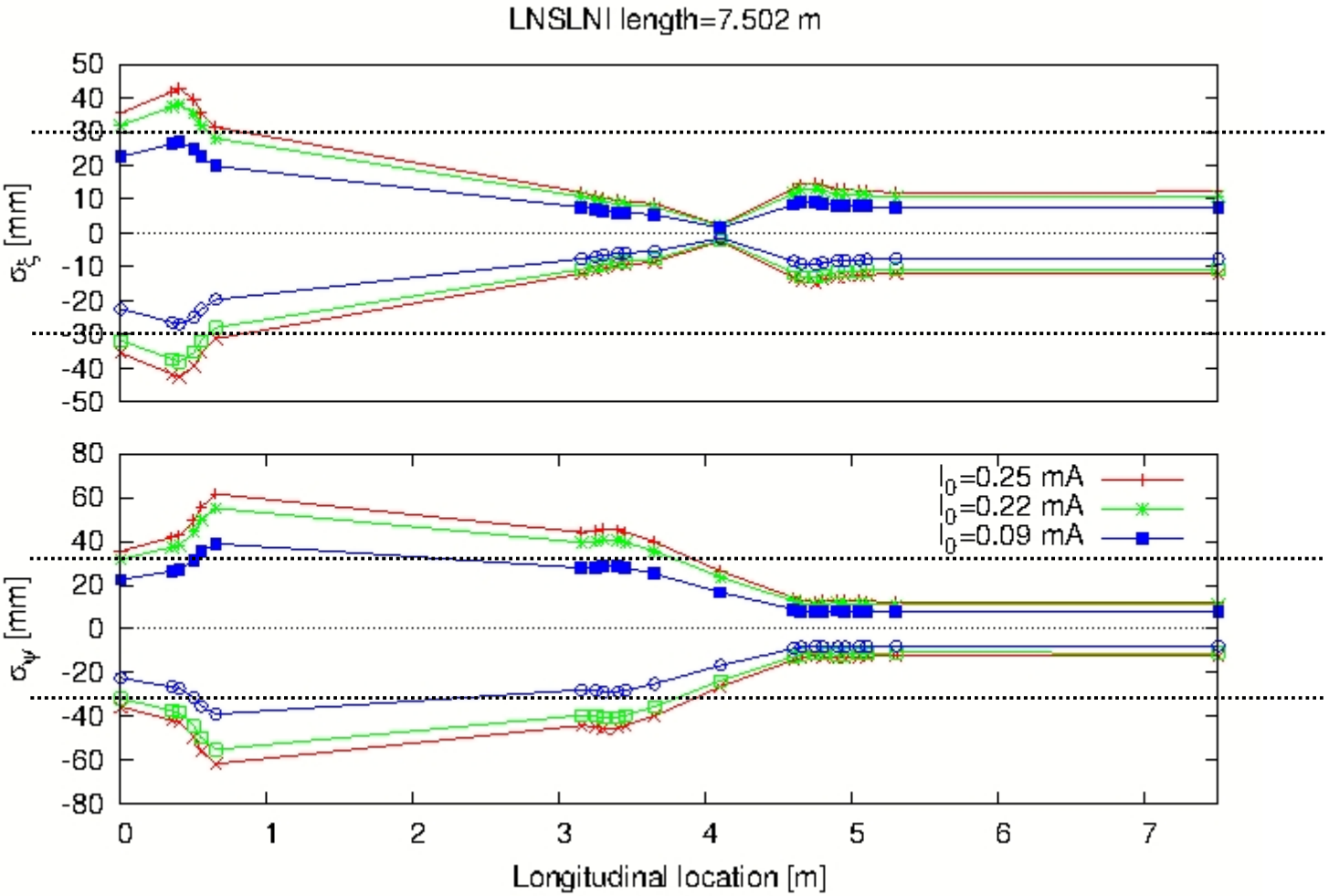
* Assumption: using the same parameters as for H

Source to extraction, via ELENA (H^-)

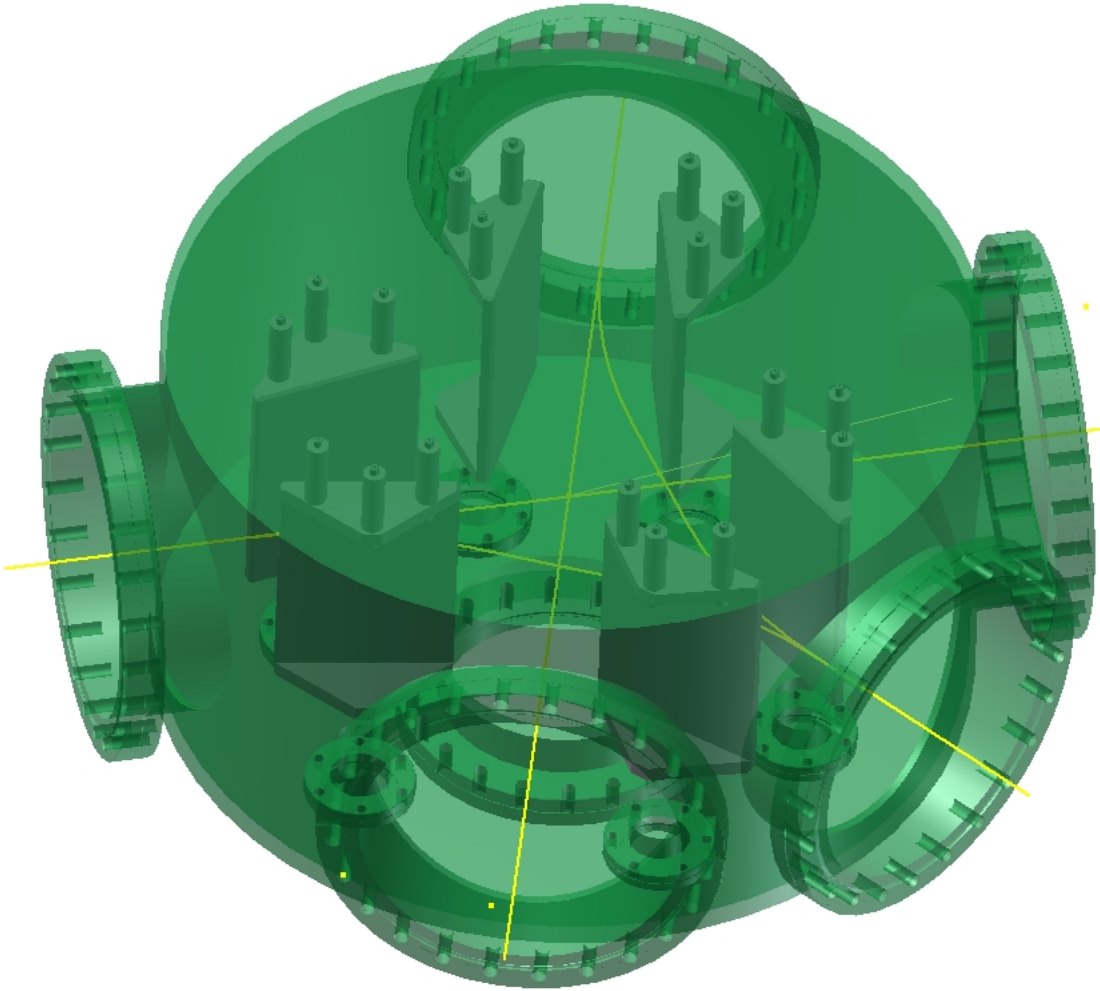


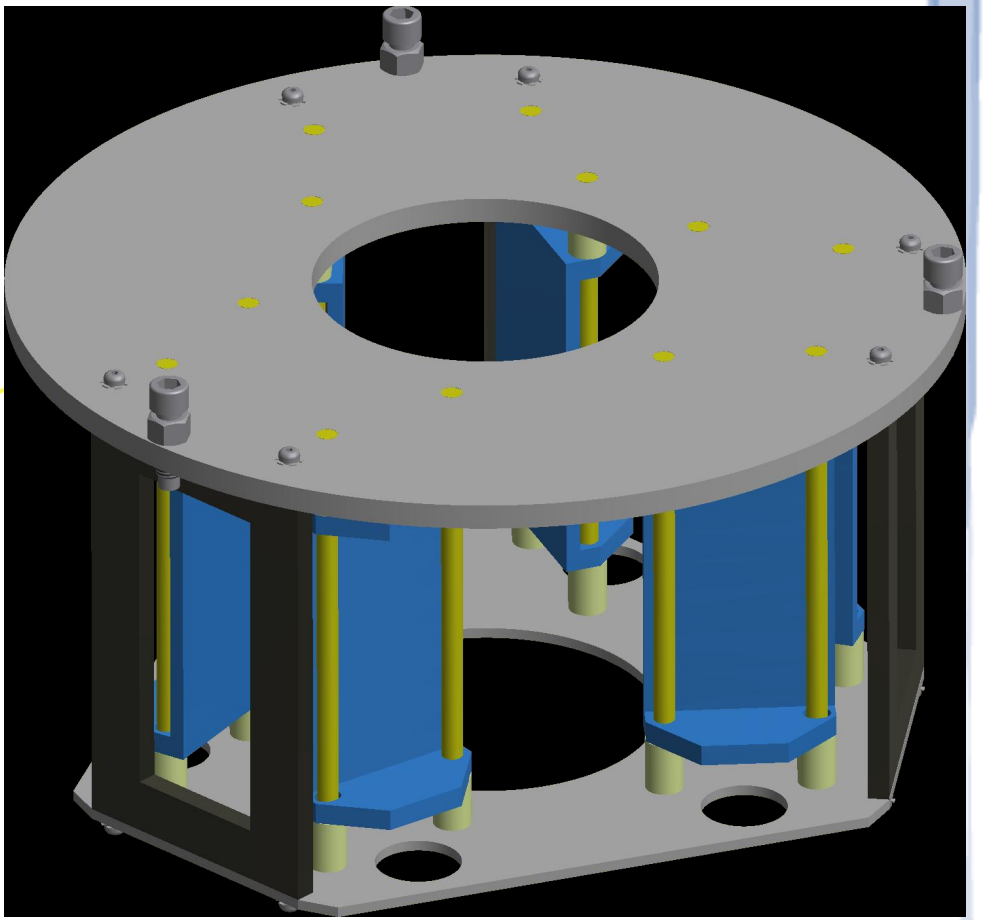
Maximum beam size 25 mm

Beam size vs. beam current



Ion switch-yard





Questions

- How many % beam loss (from the source) do we accept?
- Testing the ion switch-yard:
  - Is it feasible to test the switch-yard in Julich?
  - What timescale, i.e. when do we need to be ready?

Conclusions

- Optics ok, some mismatch with the dispersion.
- Polarity swap of quadrupoles needed in LNS, LNI and LNE (if we want to extract protons).
- Two electrostatic quadrupoles are foreseen in the LNI line.
- The design of the Ion swith-yard is progressing well.