

LINAC4 Beam commissioning

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Outlook 2018 (FROM JUNE WORKSHOP)

- Aim for the next run
 - 25mA peak current after the RFQ
 - Pulse length of 600 μ s
 - Stability shot-to-shot of 2%
 - Pulse flatness over
 - 600 μ sec : 5%
 - 120 μ sec : 2%
- To be done for beam quality
 - Study of the effect of decreasing voltage in prechopper
 - Verify chopper at 1 ms with beam
 - Test/debug all applications (emittance T and L , RF cavities, cruise control, BSM)

IMPORTANT DATES 1/2

17 July	reinstallation source	Working on gas injection
17 August	Tunnel closed	
18 August	Source restart	Tests of, amongst other CW cesiation
30 august	RFQ available	
30 august	Beam through the RFQ	Transmision still to be optimised
31 august	Beam through the RFQ and set up 3 MeV	L4sup in the CCC with OP

IMPORTANT DATES 2/2

TASK1	12 September	Beam optimised at 3 MeV	Maximise transmission through the RFQ. Take decision on the source.
	12 September	All RF chains become available	
TASK2	21 September	Beam at 160 MeV	Procedure to set phases
TASK3	28 September	Beam optimised at 160MeV	Beam qualified at 160MeV and ready for RR
	1 October	Beam ready for	

Daily debrief meeting in the LINAC4 control room

- Minimum
- 1 RF person
- 1 BI person (Federico forward to relevant colleagues)
- Either GP or Bettina from OP
- 1 linac sup
- 1 source expert if there are source issues.

Task1 – 12 September – beam at 3 MeV

- Optimise focusing and steering in the LEBT : transmission and pulse flatness.
 - Phase 1 manual
 - Phase 2 script (Python)
- Optimise source and focusing and steering in the LEBT : tuning of the source in view of RFQ transmission
 - Phase 1 manual
 - Phase 2 script (Python)
- Neutralisation and pre-chopper test
- RFQ voltage scan

Task1 – 12 September – beam at 3 MeV

- MEBT optimised settings
- Measurements on the MEBT wire-scanners (reconstruct emittance?)
- Sort out chopper /pre-chopper timing ring blanking and all the longitudinal pulse structure

Task2 – 21 September – beam at 160 MeV

- Phase and amplitude of all the cavities
 - Use beam loading + python script
 - Use ToF (???)
- The procedure was described by AL at this meeting, by JBL at the review and written up by GB in august
- Verify with beam the changes made to the RF

Task3 – 28 September – beam at 160 MeV

- Optimise beam quality at 160 MeV
 - Transmission
 - Pulse-to-pulse jitter
 -meet the specs of page
- Take reference on all ws and measure emittance at 160MeV with OP application
- Define a series of daily measurements for OP during the RR

Goals to achieve by end September:

- **Commission the RF changes deployed during the summer stop**
- **Beam quality:**
 - **~25 mA beam current at the end of the linac**
 - 600 μs beam pulse length with ~5% flatness at the end of the linac
 - 180 μs beam pulse length with ~2% flatness at the end of the linac
 - Nominal chopping scheme (~64% chopping factor) with <1% extinction factor
- Evaluate functionality of all **beam instrumentation** to be ready for reliability run → support from BI for repairs/calibrations/corrections
- Assure OP participation for **RF phasing in** to learn procedure