

# Facility Update



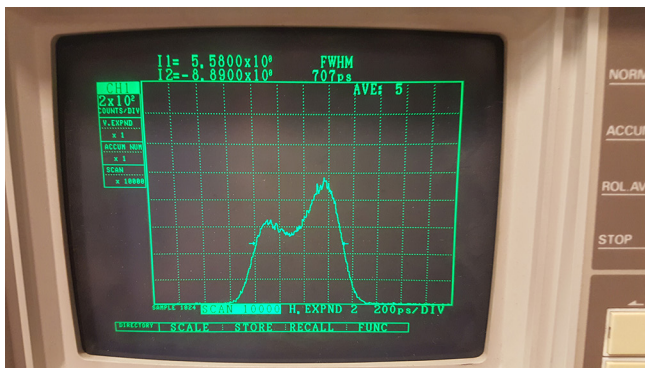
## Design current in 1.5 GeV ring

MAX IV reached the design current 500 mA in the 1.5 GeV soft X-ray storage ring during early June, and the beam current was stored and kept in top-up mode over many hours during an accelerator development shift.

This was the culmination of many years of work by the whole MAX IV team and was preceded by several weeks of preparatory work on all subsystems to work reliably, pushing the current limits during accelerator development shifts, sorting out collective beam instabilities, and improving beam diagnostics as well as our understanding of filling pattern effects on the beam.

The achievement was not simply the current value, but the fact that the beam was kept free from instabilities in the same way as during delivery at 200 mA. According to the diagnostic tools at hand, these were the beam parameters:

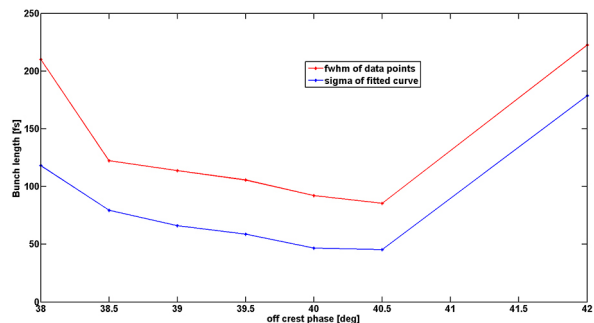
- Stored current in top-up mode: 500 mA
- Current\*Lifetime: 3 Ah
- Filling pattern: small deviations from an even fill
- Horizontal emittance: < 8 nmrad
- Vertical emittance: 0.3 nmrad (4 to 5% emittance coupling)
- Collective instabilities: suppressed by Harmonic Cavities



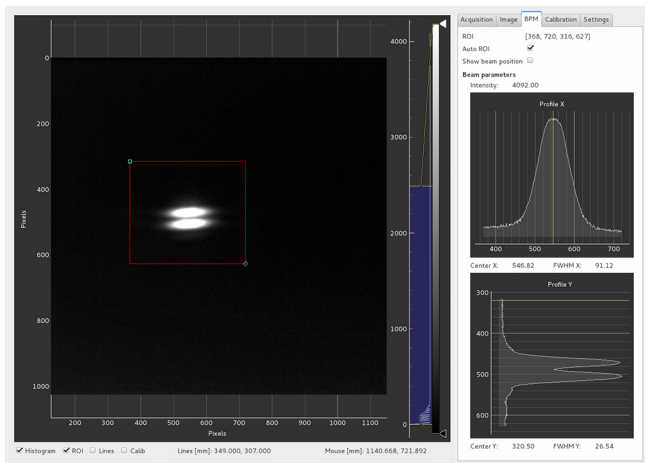
Bunch length measurement verifying the effect of the higher harmonic cavities.

## Linac below 100 fs

During the May commissioning week for the MAX IV Linear Accelerator a big milestone was reached. The electron bunches accelerated in the linac was compressed to a time duration below 100 fs. In fact, we could measure a pulse duration as low as 65 fs FWHM. The RMS bunch length was then recorded at 32 fs. These results were achieved using only the first of the 2 electron bunch compressors in the MAX IV linac and shows not only that we can deliver short electron bunches, but also that the novel concept adopted in the compressors is working according to theory and simulations.



While optimizing compression factor through scanning the off crest phase before the first bunch compressor in the MAX IV linac, a minimum value of 65 fs FWHM and 32 fs RMS was achieved.



Beam size measurements ensuring the transverse stability.

## Updated timeline

Building a unique research infrastructure is an exciting and demanding task. Some things go as expected, others don't. Opening as many beamlines to user as possible is not happening as fast as anticipated in the initial project plans, many of them dating back to 2011. To open beamlines as soon as possible to users we are reorganizing our internal work. We have just opened a first call for commissioning experts at the Bloch and FinEstBeAMS beamlines and further such calls for FemtoMAX, FlexPES, MaxPEEM, SPECIES and Veritas are planned before the end of the year. Read more at [www.maxiv.se!](http://www.maxiv.se)

