

Electron Beam and Synchrotron Light at the ALBA Booster
Results of the commissioning
25.01.10

The commissioning of the Booster started on the evening of the 21st of December of 2009. On that night the beam was transported from the Linac to the Booster for the first time.

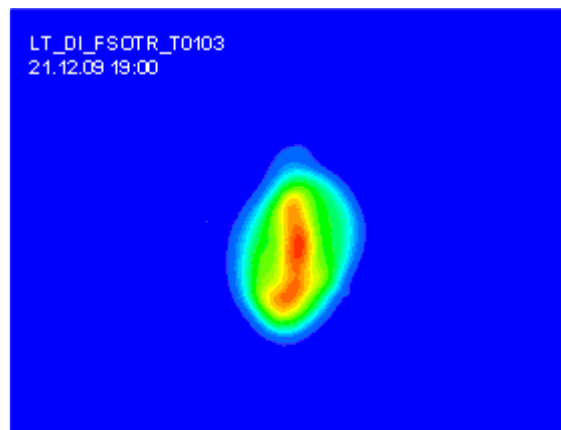


Fig. 1 Beam just on the LT, in front of the BO

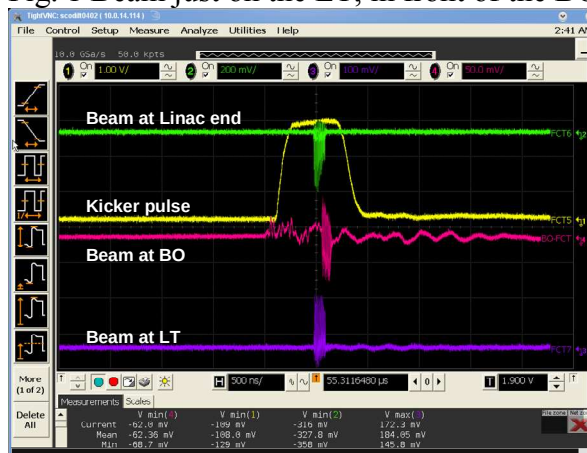


Fig. 2 Scope image of the beam as seen at the different Fast Current Transformers at the end of the Linac, at the LT and at the entrance of the BO

After that ALBA was closed for Christmas and the commissioning restarted on Monday the 11th of January 2010.

On Tuesday 12.01.10 the beam made the first turn around the Booster and a few hours later some 100 turns were observed.

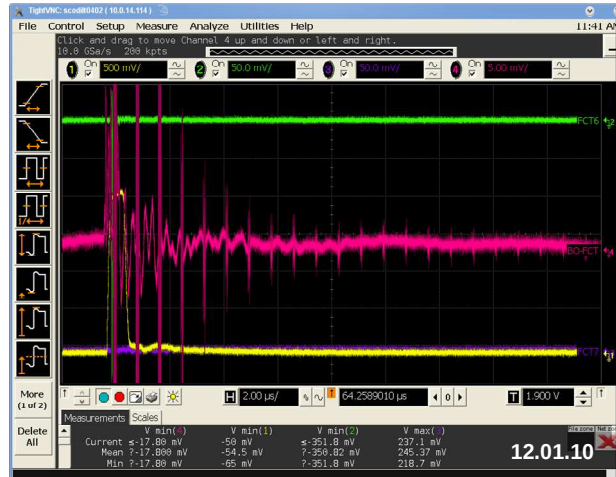


Fig. 3 Scope image of the beam in the BO performing up to more than 20 turns.

After tuning the magnets of the Booster and those on the Transfer Line many turns were observed in the BO during Wednesday and Thursday. Note that the time scale on the scope picture is now set at 10 ms.

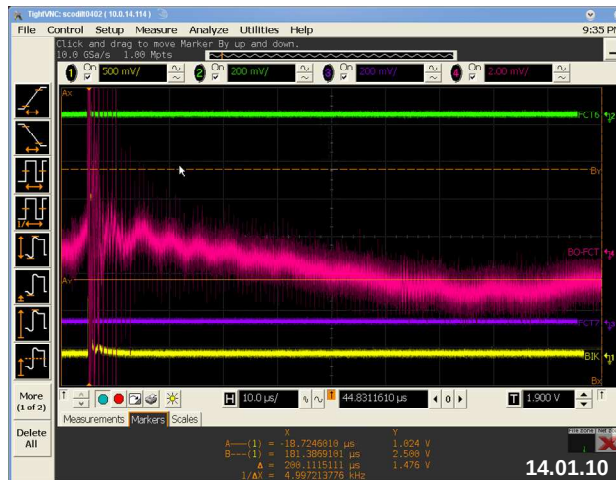


Fig. 4 Scope image of the beam in the BO performing many turns.

On Sunday 17.01.10 the Radiofrequency system was switched on and the beam captured.

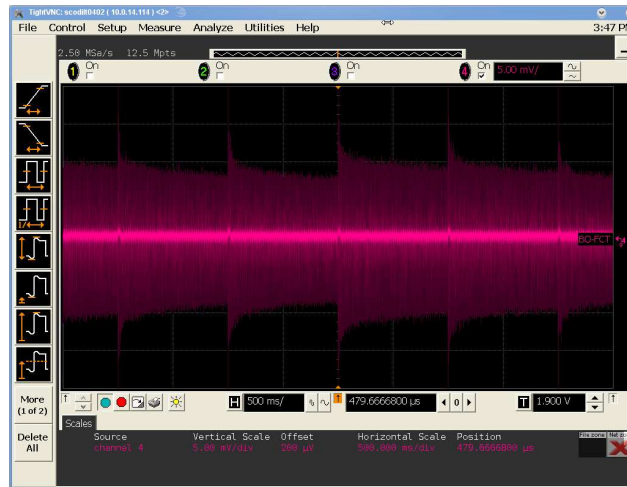


Fig. 5 Scope image of the beam in the BO showing 5 injections and the beam survival during one pulse

We were then ready to increase the energy of the electron beam. The maximum energy for the Booster is 3 GeV, nevertheless it was decided on a first stage to increase the energy only up to 600 MeV. This stage was achieved on Tuesday 19.01.10 evening. The scope picture shows the beam along the ramp, it can also be observed that the beam was even de-accelerated down to around 450 MeV where it was lost. It is also the first time that synchrotron light has been observed at ALBA.

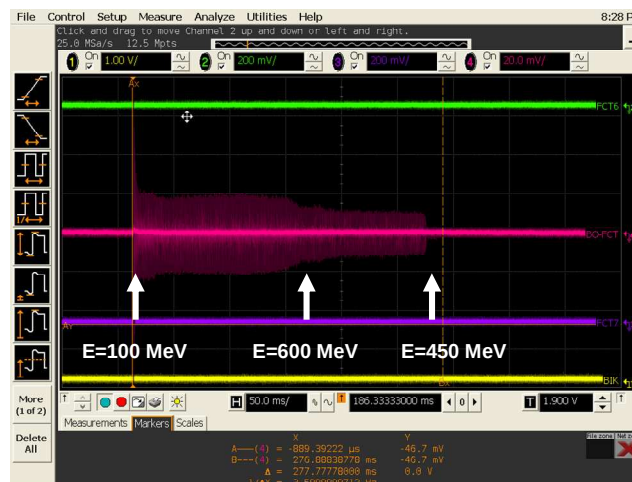


Fig. 5 Scope image of the beam in the BO during one ramping cycle

On Thursday 21.01.10, around 0.7 mA of beam current was accelerated up to 2.7 GeV.

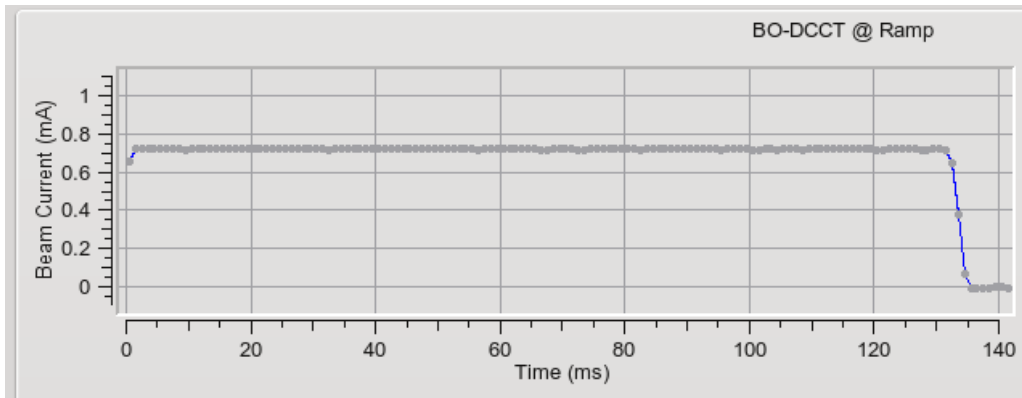


Fig 7: Beam Current of 0.7 mA reaching 2.7 GeV (132 ms).

Once the goal of testing that all sub-systems are running correctly had been achieved, then the beam was set at 100 MeV and at 1.3 GeV and different measurements were performed to characterize properly the electron beam.

This Booster commissioning run was finished on Sunday 24.01.10 in order to continue with the final Storage Ring installation.