DIAGNOSTICS DURING SESAME BOOSTER COMMISSIONING

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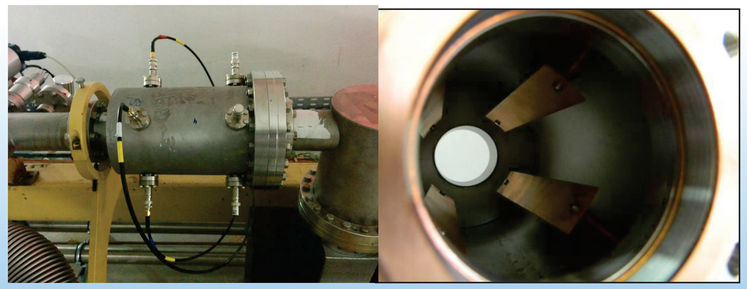
INTRODUCTION

SESAME is a 2.5 GeV synchrotron radiation facility under construction at Allan (Jordan), consisting of a 20 MeV Microtron as pre-injector and an 800 MeV Booster Synchrotron. The pre-injector and Booster are originally BESSY-I machine with some major changes within power supplies and diagnostics tools. SESAME succeeded to get the first beam from Microtron and put the Booster under operation , commissioning of the Storage Ring by the end of 2016 and the first Beam Lines in 2017. This poster presents the diagnostics instruments (BPM, FCT, DCCT, FOM and SRM) it's upgrades and some commissioning results.

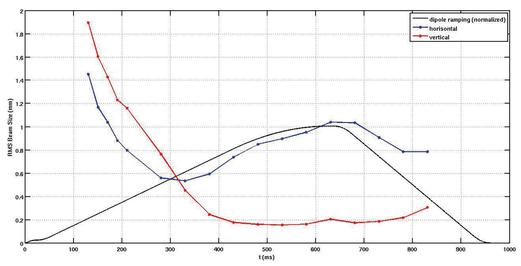
BPMs



4 strip line BPMs and 2 button in the Booster. One of the SL used as Shaker and BPM. Libera Electron is used to measure the position and track the beam. All of Libera modes can be used. Basic mode, which are: first turn, demand mode (Turn by Turn) with AGC and DSC off, zero attenuation and fixed switching mode (3).

SRM

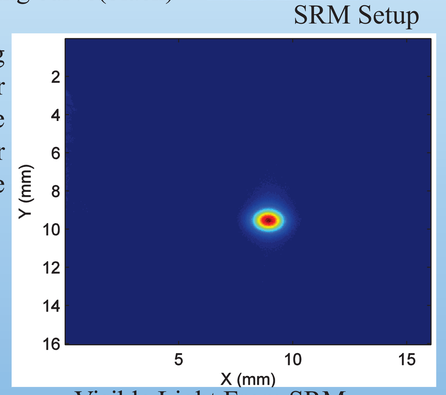
A completely new vacuum chambers for the dipole had been fabricated for the Booster ring that gave the possibility to fabricate one of the chambers with a glass window for SRM diagnostics . The optical system is designed to fit the whole glass window and reflect the light to CCD camera. Old system currently installed from BESSY, a new one is designed to have more accurate measurements.



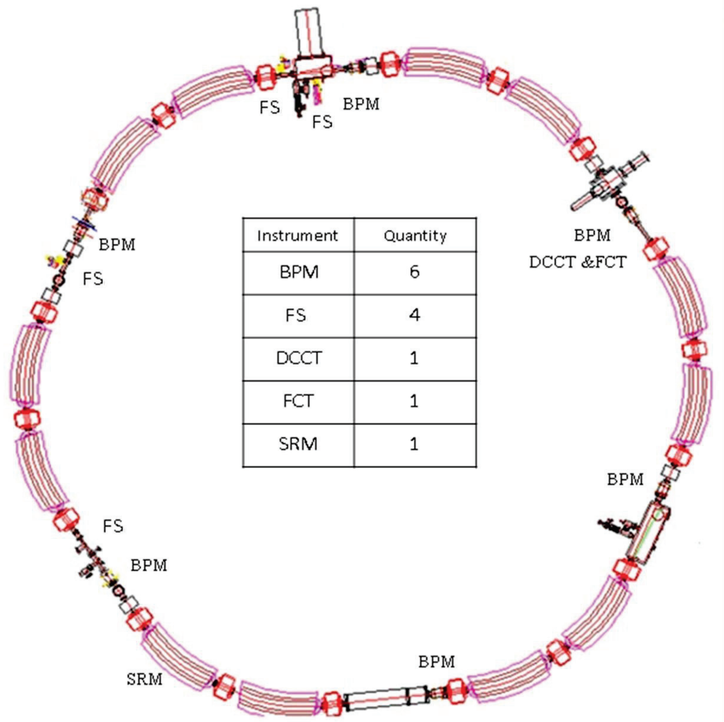
Measured horizontal (blue) and vertical beam size (red) during the ramp, dipole ramping curve(black)

SRM Setup

To measure beam size during ramping, a trigger for camera (Basler acA1300-gm) was varied from the beginning to the end of ramp. For each step 10 shots from camera were taken fitted to Gaussian distribution.



Visible Light From SRM



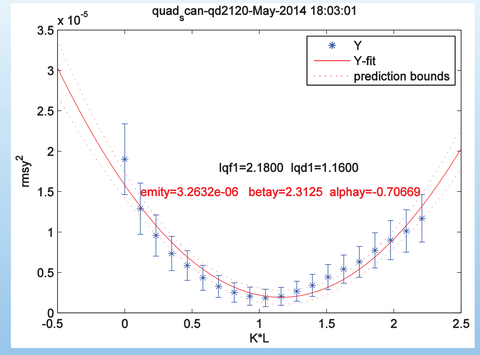
Instrument	Quantity
BPM	6
FS	4
DCCT	1
FCT	1
SRM	1

Booster Synchrotron

FLUORESCENT SCREENS

Fluorescent Screens (FS) are installed in Booster ring which have Aluminium Oxide screens and analog cameras connected to a signal switcher which allows monitoring one camera on the TV monitor in control room. All FS are activated pneumatically.

We placed one FS to monitor the beam path along the Transfer line 1 while 4 more are installed in the Booster . Measurements of Microtron emittance were done by Quadruple scan method



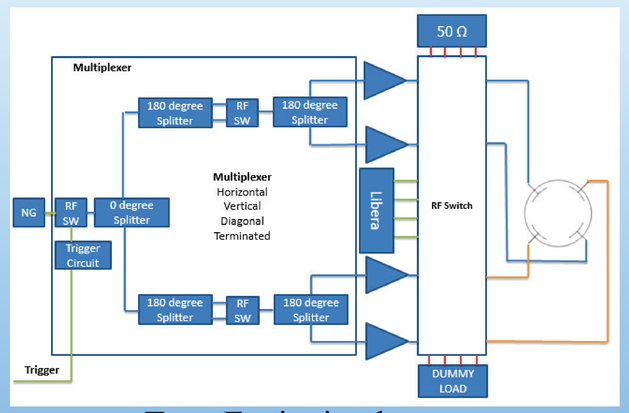
Emittance Measurement of the Microtron in TL1 in vertical plane.

FCT & DCCT

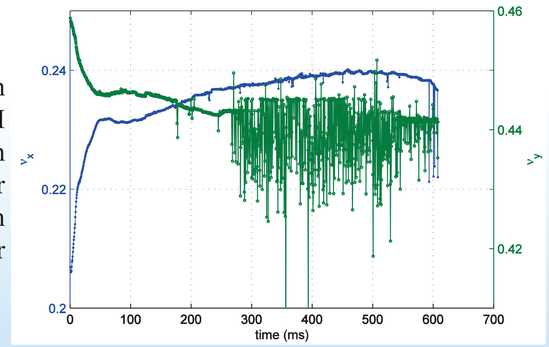
FCT and DCCT are commercial one (Bergoz).The shield was designed in-house; it consist of two cylindrical half's of low carbon steel. Both FCT and DCCT are connected to an oscilloscope via coaxial cables and monitored in the control room.

TUNE MEASURMENT

The layout of the tune consist of white noise generator with a multiplexer and 50W amplifiers. The Shaker works as BPM by RF coaxial switch .Each stripline will have 2 switches one in the upper stream (Libera and 50 Ω dummy load) and the other in down stream (Amlifier and 50 Ω termination). Turn by Turn data taken from Libera @revolution frequency then a fourier analysis in Matlab. .

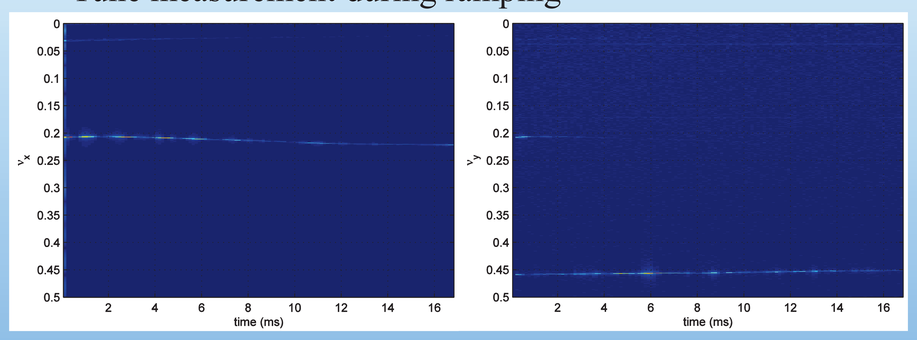


Tune Excitation layout



Tune measurement during ramping

The tunes can be tracked dynamically during the ramping process across all the turns till 630ms.Programed code in Matlab started to increase the level of white noise signal as the beam energy increases and synchronize the timing between the Libera and the shaker trigger and shift the time to fit the whole period



Hor.(left) and Ver.(right) Tune at Injection