

Physics Application Testing against SRF Devices

Overview:

The tested applications are about beam central trajectory correction, based on the response matrix approach. The overall testing platform is setup by running a virtual accelerator in the workstation, which provides a full EPICS controls environment, to achieve the most similarity as the real FRIB accelerator. While the virtual accelerator is not purely 'virtual', two of the devices are connected to the real SRF devices, they are 'LS1_CB02:DCH_D1319' and 'LS1_CB02:DCV_D1319', connecting to 'C7SR_CMTF:PSC1_N0001' and 'C7SR_CMTF:PSC2_N0001', respectively, during this test, the current changes will be applied, e.g. 'C7SR_CMTF:PSC1_N0001:I_CSET'. The calculated current values from physics applications are about to applied to the devices.

Testing Procedure:

1. Start Virtual Accelerator App with the machine name of 'VA_LS1FS1', segment name of 'LS1_TEST_1319'
2. VA initialization for testing: `caput VA:LS1_CA01:DCH_D1132:I_CSET 20`
3. Start app: Trajectory Viewer, cmd: `trajectory_viewer`
 - a. Load lattice: 'VA_LS1FS1', 'LS1_TEST_1319'
 - b. Select all the BPMs to show the beam central trajectory
4. Start app: Orbit Response Matrix, cmd: `orm`
 - a. Load measured response matrix, filename: `m_ls1_full_1319_from1319.json`
5. Start testing
 - a. Change set limit, default is from -5 to 5
 - b. Click 'Evaluate' button to calculate the corrector settings based on current trajectory readings and response matrix
 - c. From the popup window, double check the settings will be output to the device, among which, device name: LS1_CB02:DCH_D1319 and

LS1_CB02:DCV_D1319 are connected to the correctors of SC solenoid,
(The setpoint PV names are C7SR_CMTF:PSC1_N0001:I_CSET and
C7SR_CMTF:PSC2_N0001:I_CSET, respectively)

- d. Based on the defined set limit, the 'Setpoint(New)' column may show with different value
 - e. For the set limit of [-5, 5], the calculated settings ('Setpoint(Raw)' column shows) of (8.5, -10) will be limited to (5, -5)
 - f. If 'OK' button is clicked, the settings will be marked as ready to apply
 - g. Go back to the main UI of ORM, and push 'Apply' to output the settings to devices
 - h. camonitor C7SR_CMTF:PSC1_N0001:I_RD and
C7SR_CMTF:PSC2_N0001:I_RD to see the changes, this could be issued in another computer or OPI to always monitor the corrector settings.
6. Change the initial VA by Restarting VA and 'caput
VA:LS1_CA01:DCH_D1132:I_CSET <other value>', then iterate 3-5.