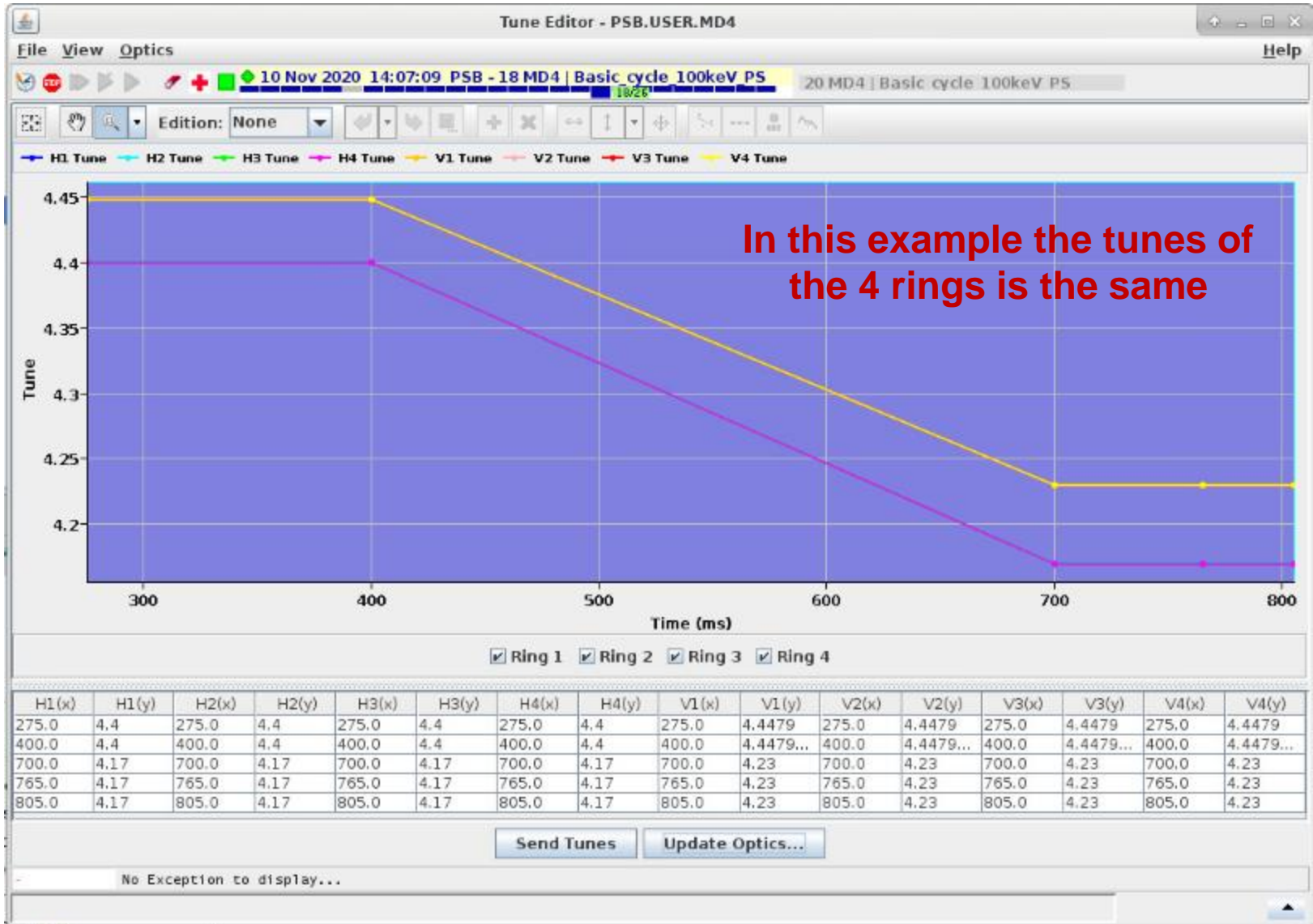
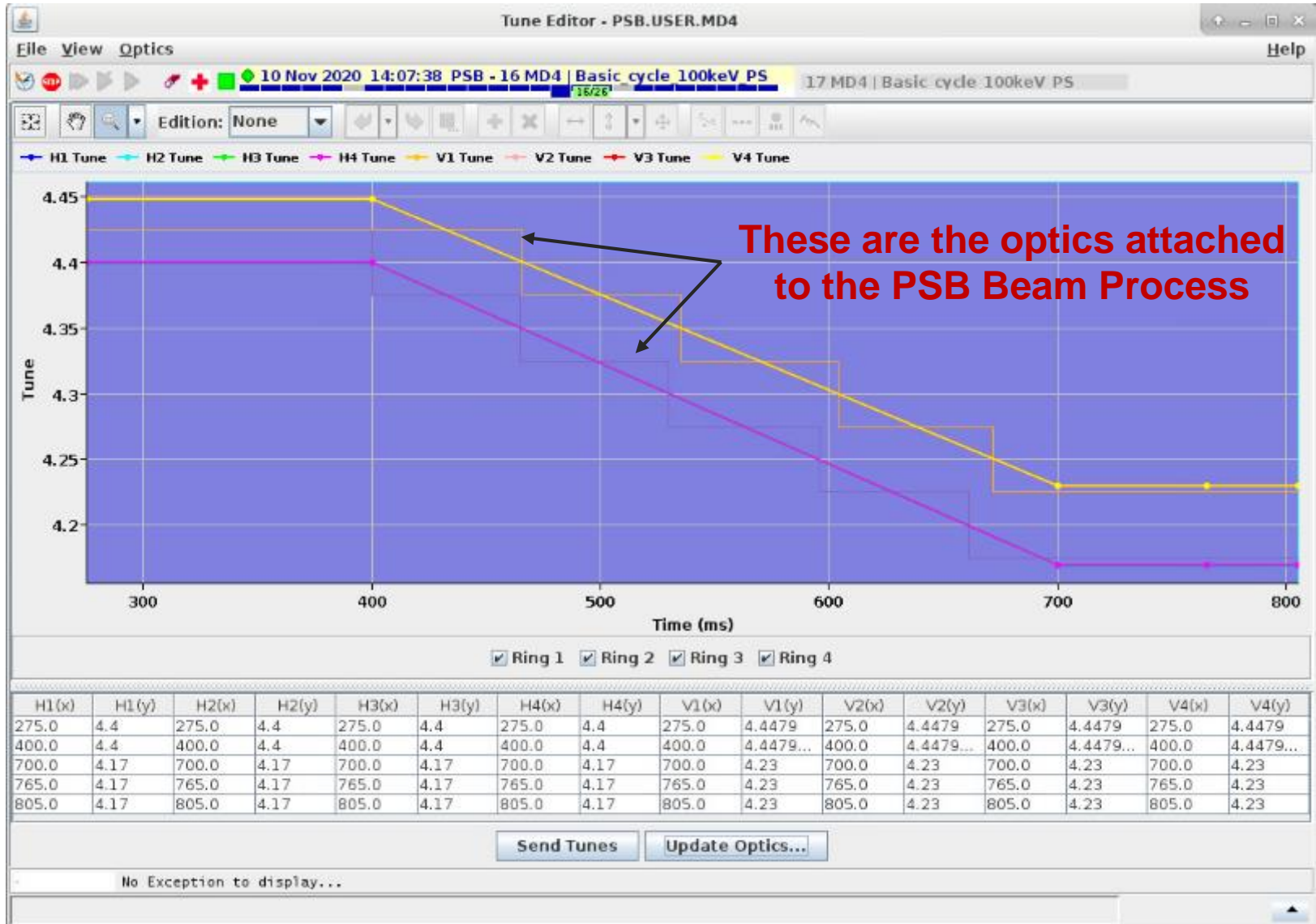


PSB Tune Control & Knobs

Tune Editor GUI



Tune Editor GUI



Tune Editor GUI

The screenshot shows the Tune Editor GUI for PSB.USER.MD4. The main plot displays Tune (y-axis, 4.2 to 4.45) versus Time (x-axis, 0 to 800). Several lines represent different optics: H1 Tune (blue), H2 Tune (cyan), H3 Tune (green), H4 Tune (magenta), V1 Tune (yellow), V2 Tune (orange), V3 Tune (red), and V4 Tune (light blue). A red text box with arrows points to the V1, V2, and V3 lines, stating: "These are the optics attached to the PSB Beam Process".

An "Optic generation" dialog box is open, showing a table of parameters for four regions (R1, R2, R3, R4) at various time points. The table contains the following data:

Time	R1	R2	R3	R4
275	psb_qx 4.425_qy 4.425	psb_qx 4.425_qy 4.425	psb_qx 4.425_qy 4.425	psb_qx 4.425_qy 4.425
400	psb_qx 4.375_qy 4.425	psb_qx 4.375_qy 4.425	psb_qx 4.375_qy 4.425	psb_qx 4.375_qy 4.425
465	psb_qx 4.325_qy 4.425	psb_qx 4.325_qy 4.425	psb_qx 4.325_qy 4.425	psb_qx 4.325_qy 4.425
466	psb_qx 4.325_qy 4.375	psb_qx 4.325_qy 4.375	psb_qx 4.325_qy 4.375	psb_qx 4.325_qy 4.375
530	psb_qx 4.275_qy 4.375	psb_qx 4.275_qy 4.375	psb_qx 4.275_qy 4.375	psb_qx 4.275_qy 4.375
535	psb_qx 4.275_qy 4.325	psb_qx 4.275_qy 4.325	psb_qx 4.275_qy 4.325	psb_qx 4.275_qy 4.325
596	psb_qx 4.225_qy 4.325	psb_qx 4.225_qy 4.325	psb_qx 4.225_qy 4.325	psb_qx 4.225_qy 4.325
604	psb_qx 4.225_qy 4.275	psb_qx 4.225_qy 4.275	psb_qx 4.225_qy 4.275	psb_qx 4.225_qy 4.275
661	psb_qx 4.175_qy 4.275	psb_qx 4.175_qy 4.275	psb_qx 4.175_qy 4.275	psb_qx 4.175_qy 4.275
672	psb_qx 4.175_qy 4.225	psb_qx 4.175_qy 4.225	psb_qx 4.175_qy 4.225	psb_qx 4.175_qy 4.225

Below the table is a "Generate" button and a text input field. At the bottom of the dialog, there are "Send Tunes" and "Update Optics..." buttons. The status bar at the bottom of the GUI displays "No Exception to display...".

Optics Management Application v12.4.2 connected to server PRO

Icons: [Home] [Refresh] [Stop] <none>

Optics | Import Elements | Import Knobs

Available JMad Optics

Filter: [?]

psb_qx_3.975_qy_3.975
psb_qx_3.975_qy_4.025
psb_qx_3.975_qy_4.075
psb_qx_3.975_qy_4.125
psb_qx_3.975_qy_4.175
psb_qx_3.975_qy_4.225
psb_qx_3.975_qy_4.275
psb_qx_3.975_qy_4.325
psb_qx_3.975_qy_4.375
psb_qx_3.975_qy_4.425
psb_qx_3.975_qy_4.475
psb_qx_3.975_qy_4.525
psb_qx_3.975_qy_4.575
psb_qx_3.975_qy_4.625
psb_qx_3.975_qy_4.675
psb_qx_3.975_qy_4.725
psb_qx_4.025_qy_3.975
psb_qx_4.025_qy_4.025
psb_qx_4.025_qy_4.075
psb_qx_4.025_qy_4.125
psb_qx_4.025_qy_4.175
psb_qx_4.025_qy_4.225
psb_qx_4.025_qy_4.275
psb_qx_4.025_qy_4.325
psb_qx_4.025_qy_4.375
psb_qx_4.025_qy_4.425
psb_qx_4.025_qy_4.475
psb_qx_4.025_qy_4.525
psb_qx_4.025_qy_4.575
psb_qx_4.025_qy_4.625
psb_qx_4.025_qy_4.675
psb_qx_4.025_qy_4.725
psb_qx_4.075_qy_3.975
psb_qx_4.075_qy_4.025
psb_qx_4.075_qy_4.075
psb_qx_4.075_qy_4.125
psb_qx_4.075_qy_4.175
psb_qx_4.075_qy_4.225
psb_qx_4.075_qy_4.275
psb_qx_4.075_qy_4.325
psb_qx_4.075_qy_4.375
psb_qx_4.075_qy_4.425
psb_qx_4.075_qy_4.475
psb_qx_4.075_qy_4.525
psb_qx_4.075_qy_4.575
psb_qx_4.075_qy_4.625
psb_qx_4.075_qy_4.675
psb_qx_4.075_qy_4.725
psb_qx_4.125_qy_3.975
psb_qx_4.125_qy_4.025

Select All

Thanks to Michi and Alex, we recently uploaded all the optics named `psb_qx_X.XXX_qy_Y.YYY` in LSA PRO

Knobs

- During the development process, we discussed with Alex and Matt and decided to include the following knobs for the PSB:
 - PSB Shavers,
 - PSB BE.BSW Bump,
 - PSB Extraction position/angle
- And later on Abdel introduced with Michi knobs for the BI.KSW.
- All seems great, so what's the issue?
- When preparing the knobs for the PSB Extraction position/angle the bumpers have to be turned on with nominal strength to close the bump
- The knobs need to be associated with an optics, say `psb_qx_4.200_qy_4.200` and it means that this specific optics has the bump turned on and cannot be used reliably during the cycle
- The standard solution is to decide a priori a set of optics which have the bumper turned on and should be used only at extraction

Optics Management Application v12.4.2 connected to server PRO

Configuration: PSB JMad Model: PSB

Available Knobs

Filter:

- be1dhz_px_urad -> PSBBEAM1/BEDHZ_PX_URAD
- be1dhz_x_mm -> PSBBEAM1/BEDHZ_X_MM
- be1dvt_py_urad -> PSBBEAM1/BEDVT_PY_URAD
- be1dvt_y_mm -> PSBBEAM1/BEDVT_Y_MM
- be2dhz_px_urad -> PSBBEAM2/BEDHZ_PX_URAD
- be2dhz_x_mm -> PSBBEAM2/BEDHZ_X_MM
- be2dvt_py_urad -> PSBBEAM2/BEDVT_PY_URAD
- be2dvt_y_mm -> PSBBEAM2/BEDVT_Y_MM
- be3dhz_px_urad -> PSBBEAM3/BEDHZ_PX_URAD
- be3dhz_x_mm -> PSBBEAM3/BEDHZ_X_MM
- be3dvt_py_urad -> PSBBEAM3/BEDVT_PY_URAD
- be3dvt_y_mm -> PSBBEAM3/BEDVT_Y_MM
- be4dhz_px_urad -> PSBBEAM4/BEDHZ_PX_URAD
- be4dhz_x_mm -> PSBBEAM4/BEDHZ_X_MM
- be4dvt_py_urad -> PSBBEAM4/BEDVT_PY_URAD
- be4dvt_y_mm -> PSBBEAM4/BEDVT_Y_MM
- bebsw_px_urad -> PSBBEAM/BESW_PX_URAD
- bebsw_x_mm -> PSBBEAM/BESW_X_MM
- shaverr1_x_mm -> PSBBEAM1/SHAVER_X_MM
- shaverr1_y_mm -> PSBBEAM1/SHAVER_Y_MM
- shaverr2_x_mm -> PSBBEAM2/SHAVER_X_MM
- shaverr2_y_mm -> PSBBEAM2/SHAVER_Y_MM
- shaverr3_x_mm -> PSBBEAM3/SHAVER_X_MM
- shaverr3_y_mm -> PSBBEAM3/SHAVER_Y_MM
- shaverr4_x_mm -> PSBBEAM4/SHAVER_X_MM
- shaverr4_y_mm -> PSBBEAM4/SHAVER_Y_MM

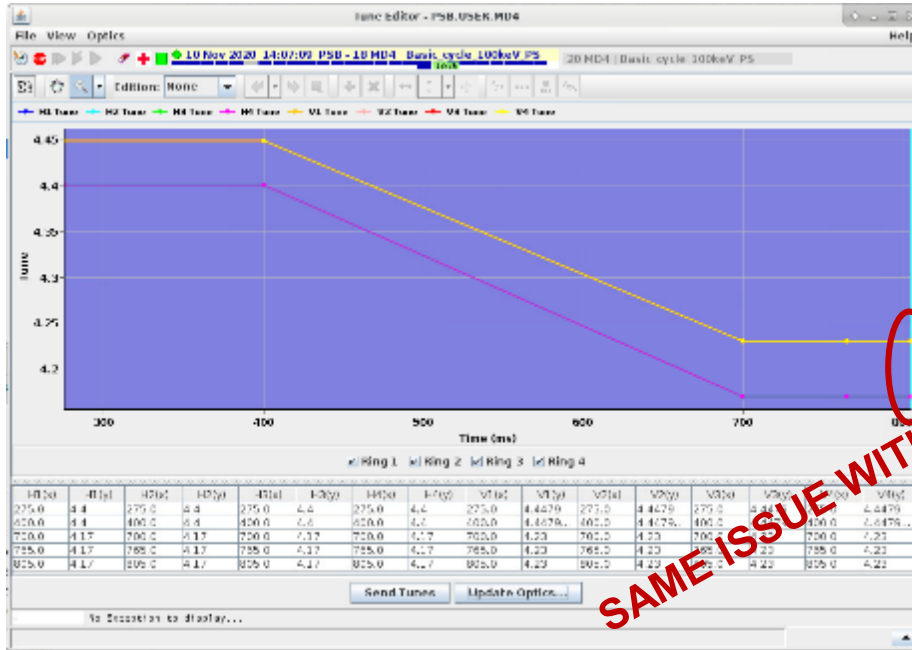
Available JMad Optics

Filter:

- psb_ext_ad
- psb_ext_east
- psb_ext_isolde
- psb_ext_lhc
- psb_ext_sftpro
- psb_ext_tof
- psb_fb_ad
- psb_fb_east
- psb_fb_isolde
- psb_fb_lhc
- psb_fb_sftpro
- psb_fb_tof
- psb_ft_ad
- psb_ft_east
- psb_ft_isolde
- psb_ft_lhc
- psb_ft_sftpro
- psb_ft_tof
- psb_inj_ad
- psb_inj_east
- psb_inj_isolde
- psb_inj_lhc
- psb_inj_sftpro
- psb_inj_tof
- psb_qx_2.975_qy_4.975
- psb_qx_2.975_qy_5.025
- psb_qx_2.975_qy_5.075
- psb_qx_2.975_qy_5.125

- For the time being Alex created special optics called `psb_ext_ad`, `east`, ..., `tof` which contains the ideal tune at extraction for each of these beam types.
- Similarly there are optics for injection, flat bottom and flat top.
- A first request is to change the name to a more explicit one as `psb_ext_lhc_qx_X.XXX_qy_Y.YYY`

Tune Control Fix Point?



SAME ISSUE WITH THE KSW KNOBS

- One approach for mitigating this issue would be to fix the end point of the tune, depending on the beam type
- What if we change the tune at extraction from the nominal one? The knobs will still assume the nominal optics, so it will work, but have 'less' predictive power. And at least a warning could be raised to tell by how much we are diverging from the set tune.
- Another solution could be to duplicate all the optics in `psb_qx_X.XXX_qy_Y.YYY` and in `psb_ext_qx_X.XXX_qy_Y.YYY` with the bump on.

SHIVERS

- The Shavers have been currently associated with all optics `psb_qx_X.XXX_qy_Y.YYY`
- The Shavers, which we ideally do not plan to use anymore, if needed should be pulsed at ~182 MeV, i.e. C306
- The hierarchy is KNOB -> logical/K -> logical/I -> FGC
- The momentum (at the right point of the cycle) and the calibration curve will always be taken into account on the K -> I conversion.
- The step in question is "KNOB -> K":
 - In general, the knob factor (from [mm] to [rad]) is optic/tune dependent.
 - Do we need to have a different factor for each optic/tune or will it be good enough to have one that works (more or less) for all optics?

INJECTION POSITION/ANGLE

- As the BI.DVT50 and BI.DVT70 have no quadrupole in between, their factor are **independent** of the **debuncher setting** and since they are on the injection line, they are **independent of the PSB tune at injection**.

Supporting Slides