

Minutes of PITZ Physics Seminar, 15.10.2020

Project: PITZ

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### Agenda:

- 1) AoB
- 2) Talk by Anusorn Lueangaramwong: First measurement of centroid sliced energy spread using TDS amplitude scan
- 3) Talk by Namra Aftab: Longitudinal phase space tomography with CDS booster (intro)

### Results:

- 1) AoB:
  - a. Booster will not be available for one month
- 2) Talk by Anusorn:
  - a. MK: Is the beam energy fixed? AL: Only in the PSI setup
  - b. MK: Red and blue points? AL: Red points are not considered, one has to low streak parameter, i.e. the result shows the projected energy spread, the other point might give wrong value due low SNR
  - c. HQ: What is your estimated beam size at Disp3.Scr1 due to beta function? (Without energy spread): XKL: It is 0.3mm beam size, calculated with transfer matrix from TDS (?).
  - d. MK: Could we measure at High2.Scr2 the beam size, to estimate the beam size? It is not 100%-ly a reference screen.
  - e. HQ: How do you get 0.3 mm here? It should be 0.2 (something). What is the contribution to energy spread measurements?
  - f. HQ: According to equation, you have to do the TDS voltage scan for different beam energies. You have to keep beta function constant, which is probably only possible with a low energetic beam
  - g. HQ: We first need to simulate this experiment. MK: True
  - h. MK: Are you taking quadrupole transfer matrices into account for the reconstruction. AL: It should be fine with this TDS setpoint
  - i. AL: Voltage is linear with TDS SP
  - j. MK: One could use the EMSY2 slit and the LYSO screen at HEDA2
  - k. HQ: Try to measure projected energy spread vs. TDS voltage first.
  - l. PB: Should the slice mean momentum curve not be symmetric?
  - m. PB: Should booster and gun not be operated at MMMG phase?
  - n. RN: Phase advance of 180deg will cancel out the TDS shearing, i.e. you keep the vertical beam size, and you will get a good signal-to-noise for the projected energy spread measurement

- 3) Talk by Namra:
- a. MK: Improve reconstruction method by having a good first guess.
  - b. MK: Temporal profile should not change, but going off to far with the booster phase leads to velocity bunching
  - c. HQ: Reconstruction of longitudinal emittance is more complicated than full reconstruction of longitudinal phase space
  - d. MK: For this, one have to keep in mind that the mean energy changes with phase scan
  - e. HQ & MK: The phase steps rotate the longitudinal phase space non-linearly
  - f. HQ: What is the final resolution of your tomography, and how does it depend on your HEDA1 momentum resolution?

**Next steps:**

| What is to be done ? | By whom ? | Until when? | Done on |
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Protocol prepared by  
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 (Name, Date)