Minutes of RESULTS, PITZ Physics Seminar, 19.05.2022

Project: PITZ
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Agenda:

1) AOB
2) Raffael, Rehearsal of IPAC talk on slice emittance
3) Andreas, Update on green pulse shaping

Results:

1) AOB
    a. FS: Mobile work possible now as we got email. JAG results common statement is work at DESY is significant then home office. How is mobile work possible now? When is it valid? MG: After summer holidays. RN: mid of August. MG: 3 months from when you apply for mobile work. In exceptions can be less. FS: More details in coming PPS. Strongly recommends coming to office.
    b. FS: Andreas when can we have laser results? AH: in mid of June or start of June.
    c. FS: Abstract submission of FEL is done? PR: Yes. GG: Today. MK: 1 done other today. RN: Today. FS: Sandeep is not here and not clarified. Anne will clarify. AH: Yes. MG: will be done.
    d. FS: workshop at Armenia. X-Li will probably take part. Also planned experiment from PTB at this point
    e. FS: LINAC abstracts have been submitted
    f. FS: X Li will give talk on beamline design soon. Quads have to be ordered soon. XL: Copper windows tests soon to be done it is preference. Also some simulations to be done.
    g. FS: Zakaria you have to fill part b of agreement to get access to the code. ZA: We should have some flexible plan regarding timings. In agreement, only permanent scientists at PITZ should sign. FS: Yes, probably I will. FS: Any progress on method of frozen showers. ZA: I tested my own model. It gives good results. FS: We should discuss with Torsten. ZA: After collab meeting
    h. FS: Humboldt student lab status? GG: No. QE of aged cathodes to be done. AO: The student could be a good candidate to test the procedure.
    i. FS: Outcome of studies at PTB. FR: the results not so good. Difficulties with PS. The bias voltage was not stable. FS: Ask them which parameter range they want to look at and what we have to look at to do the tests?
    j. FS: What should be done when you submit a publication? You have to get acceptance from director. There are collaboration boards to check the

papers. Also true for conference papers. Primary author should also submit paper to library. We have to update twice for library. How can be that done? HQ: I will give a teaching how to do it. I submitted my slice energy spread. After submitting to collab, then there is another step before final submission. e.g Yesterday I submitted, after 1 hour declined, then many questions. Then it was 5 already. Today follow-up and then possible only. So depends on library load. Be prepared to submit early. Bottleneck is library. MK: Sometimes no remarks from board. FS: If they don't respond then they are late. MK: then it should be Yes ?FS: Try to give 2 weeks to board. Then its fine. AH: When we have deadline for conference, submit it 2 weeks in advance. FS: Yes. Now submit to board as well as library.

k. MK: Don't change timings with Matlab Scripts. FS: The idea was to adjust with laser, booster. MK: timing adjustment is done but to be done in correct way. Winfrid will give teachings that which knobs could be touched. RN: I took TDS data and adjustments should be done in Morning shifts when RF people are around. FS: It has to be agreed with hardware work. MK: I suggested to do online but he wants to do in office. FS: Also possible at start of evening shift. MK: It could take several hours. AO: He chould come really early in the morning. MK: then is ok.

2) Rehearsal of IPAC talk on slice emittance
   a. FS: 18 minutes total
   b. HQ: general impression from title is slice emittance reduction but it is focused on slice emittance diagnostics. No discussion from physics side. Should be added. What is lessons for other colleagues at conference? In intro how to reduce slide emittance is not there. Diagnostics overshadowed reduction. FS: I agree. title should be slice emittance measurement. RN: It is title of abstract. FS: What did you promise in abstract? RN: The same as talk sub-title. FS: You submitted emittance reduction using laser pulse shaping. RN: I agree with Houjun I can include the physics. FS: How much can you fill the expectation. HQ: Review what has been done till now? We are not the first ones. Why our work is special. FS: From other facilities it is better .MK: Just put experimentally slice measurement procedure. MG: You don't have to show absolute low values but path to low reduction.
   c. FS: slide 22 clarify temporal and transverse distribution for each case. Make a table. Can you include points that Houjun has made? RN: Yes nonlinearities of SC. MK: more details will be helpful. FS: Still have time for improving slides and then give another rehearsal.
   d. FS: use laser pointer.
   e. FS: slide 1 put whole title. MK: Introduce bunch compressor
   f. PB: Better if introduction with pic to FEL. RN: Emittance start is better
   g. MK: start with facility. FS: Its fine like this.
   h. FS: slide3, Abbreviations should not be used. Remove extra labelling LEDA HEDA1, PST, Change CDS by Booster. AO: Make box around components you use. PB: bunch charge range? FS: say main bunch charge

i. MG: Slide 4, European XFEL.
j. FS: Slide 6, Include streak on screen as TDS included. RN: Yeah.
k. MK: normalized or geometric emittance? FS: slide 2, lambda is radiation wavelength.
l. FS: SNR higher shows higher emittance and shows higher error. RN: It worsens temporal resolution. MK: e.g SC high. PB: SNR should be defined: why slice emittance is higher than Projected emittance. FS: graph should show R12 vs error and not only emittance.
m. FS: what is laser PL? give fwhm number for temporal lengths. RN: Peak current is imp for fair comparison and not fwhm. Standard 6.6ps but didn't measure it. RN: For flattop there is simulation, for gaussian I don't have it. FS: What are peak currents for diff cases? RN: comparable from simulation. TDS was broken at that time do could not do it. It is written in graphs.
n. MK: slide 13, put title of Projected phase space. AH: slide 15, paper ref it is in archive means it is not published. Find out about this guy. AO: In particle physics it is quite common to put in archive.
o. MK: Beam characteristics slide: Make a table. FS: slide 18: In center of top graph, measurement agrees with simulation → is not true. It is not less than 4%. RN: When I agree I mean it is less than 10%. MK: say general agreement. Fair agreement is disagreement.
p. FS: Do you have a specific systematic error for all time stamps: No. it won't be accurate. FS: Check numbers and curves slide 18.
q. PB: slide 20 X.Li comments on emittance compensation. RN:We didn't manage to compensate emittance misalignment.MK: Were you optimizing emittance. RN: I used core and Halo model and scanning Imain. Gun and booster at MMMG phase.
r. FS: We are the first ones doing what? RN: No one has ever did emittance decomposition. FS: We for the first-time applied methodology of Mitchell on out experiment. Check again with people at PSI. RN: I can check it and rephrase it.
s. FS: Name of all people who contributed.
t. FS: How do you estimate your 4%?

3) Update on green pulse shaping
   a. AH: Green pulse shaper update
   b. Outline of the talk o IR pulse shaper recap o Green pulse shaper o Next steps
   c. FS discussed with AH about repetition rates and output power of the laser systems.
   d. PB asked AH: Context of charge values in the tables in slide 3 and 4? Were they measured with the same machine conditions such as, same BSA, same gun gradient? o AH: All values except one of GrELLA are from measurements. Yes, all charges were measured with the same machine conditions.

e. FS commented: lack of manpower for shifts could help by make more time for laser works. • FS commented: All laser works should be done as soon as possible. green cathodes and a new gun are coming
f. GG asked AH: Why the laser pulse length is limited at ~10ps? o AH: it's a geometrical limit
g. FS asked AH: Can we go longer than ~10ps? o AH: Yes, we can, but go shorter is not possible.
h. CK commented: the shortest PL at 10ps is not acceptable. You should find a way to do it. • CK asked AH: Did you already reconstruct results from FROG? o Not yet, some calibrations needed to be done first

Protocol prepared by
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