

Minutes of PITZ Physics Seminar, 2019-07-25

Project: PITZ

Participants: F. Stephan, A. Oppelt, P. Kitisri, R. Niemczyk, G. Georgiev, H. Qian, S. Lal, M. Gross, O. Lishilin, G. Vashchenko, X.-K. Li, G. Shu, P. Boonpornprasert, J. Good, T. Weilbach, P. Huang, H. Shaker, H. Norman, N. Sinsunthithet

1) Agenda

- a) AOB
- b) S. Lal: RF design studies of 1300 MHz CW buncher for European X-FEL

2) Results:

- a) AOB
 1. Careful maintenance of Betriebsbuch crucial for PITZ operation: Concentrate on entries! Instructions inside book
 2. PITZ Publication Website will be restructured
 3. Latest contributions not visible – Delayed due to DESY library - responsible persons contacted
 4. FEL conference: Until Aug. 1st all papers must be sent to Frank (already reviewed from coauthors)
 5. Lecture at BESSY: We are allowed to go there
 6. Friday: Bring swimming clothes, don't JUMP into water
 7. Meeting in Hamburg on July 2nd (Institute of Exp. Physics): If program is interesting, we can stay
- b) Talk
 1. Several two-cell designs were investigated: Non was suitable -> Three cell design it will be
 2. Different Secondary emission yield growth rate in literature/software : CST has 2.09, while CERN paper & V. Paramonov say it's 1.24 -> Assume 2.09, since that's worst case (despite arguments against this value)
 3. Buncher Iris (in between two cells) are sensitive to multipacting -> Tweak cell shape to fix it
 4. Water flow: Shakar assumed 3 m/s as water flow. Frank had 2 m/s as reasonable number in mind
 5. Water and mechanical stress looks manageable for chosen cavity shape. 30 kHz/K frequency detuning
 6. Waveguide(s) can be used to supply cavity with RF (favourable, since DESY/PITZ does this already with existing cavities)
 7. Shunt impedance drops strongly when adding two RF feeds: Increases required power for certain RF voltage
 8. Add of two more coupler: Azimuthal octopole field -> Doesn't contribute to emittance growth (without these couplers quadrupole modes present, they contribute)
 9. Comparison of different RF couplers: Two good options identified. Emittance growth okay for both designs

10. Comment of Frank: High currents at coupler field might prevent operation. We don't know if there's a design if operates successfully with high currents at coupler, perhaps SLAC gun is
 11. No simulations on thermal load on cavity with couplers done yet. Comparison necessary
 12. To be done: How do RF parameters change when cavity dimensions change (during operation), design of RF tuners and RF couplers
- c) Questions
1. Are 2D multipacting simulations sufficient? Yes, should be okay.
 2. Thermal mechanical simulations: Are 30 um tolerance achievable? Machining tolerance should be ~ 20 um, i.e. it's fine
- d) Report from shift.
1. Laser water IL's
 2. TDS timing jumping by 1us
 3. We had Flattop (20 ps long) on Monday, already gone on Tuesday
 4. Pulse shaper: Crystal positions drifting, some positions not reachable
 5. Projected emittance measurements have priority over slice emittance (for this week)

Protocol prepared by R. Niemczyk