Minutes of RESULTS, PITZ Physics Seminar, 15.12.2016

Project: PITZ
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1) **Agenda:**
   a. V. Paramonov: Gun 5 development report
   b. V. Paramonov: CDS booster multipacting
   c. V. Paramonov: PITZ TDS WG matching
   d. AOB
2) **Results:**
   a. Gun5 prototype is manufactured (front wall+RF probe); setup was improved for better rigidity and stability. For future: setup should withstand 100 bar pressure for RF measurements. Movable antenna should be more rigid for better reproducibility. Input probe position is not confirmed now – calculated Q factor is higher than measured one. S21 matching is -75 dB (expected was -62 dB). Handmade probe manufactured and tuned (-54.36 dB for 5W signal). Current suggestions: change the probe axis direction; more strict tolerances for the probe hole; set of rigid probes of different lengths (0.2 mm step, 5 probes in total) for RF tuning. Q(FS): can we fill the insertion channel with ceramics/insulator else in order to protect the probe from touching the wall? A(VP): could cause vacuum problems, multipacting ->more complicated overall. SP: beginning of the next year there will be a meeting with the manufacturing company.
   b. The booster is designed to be multipacting free/dark current free. II&MK had simulated dark current simulations: DC grows significantly in 3 cells after the coupler. INR conducted multipacting simulation, playing with SEY(secondary electron emission) factor: SEY=1.3 * pure copper -> a lot of dark current, like in reality -> **cavity surface pollution confirmed,** probably with heavy hydrocarbons. VP does not support an idea to manufacture a new cavity (expensive, risk of the same problems), but supports the dry-ice cleaning (worked well already for long TDS structures). FS argues that we are afraid to move the Booster since there was a problem with cooling system before. Q(MK): one should simulate solenoid around booster. A(VP): give me proposal with a financial plan first.
   c. The latest proposal was to install matching devices into the WG. RF-group done some additional measurements, now INR has to simulate and design such matching devices for the PITZ case, should be done by spring next year. Thermo-stabilization simulations were done: more heat exchange

through the air than through the cooling system->thermo-insulation box needed (and something is already implemented), to be investigated. If there is a good solution, report to XFEL. INR considers the problem as solved.

d. Master-phd-seminar: talks requested! Send feedback to Frank.

e. Publications list is finalized hopefully.

What is to be done?	**By whom?**	**Until when?**	**Done on**
Get a closer look on mechanical design for the probe feedthrough	SP&VP		
Try to improve simulation results for the Gun5 probes			
Think about mounting procedure for the probes			
Consider dry-ice cleaning of the booster in PITZ tunnel (without transportation to Hamburg)	SP		

Protocol prepared by O. Lishilin
on 2016-12-15