

Minutes of the SPL working group

meeting no. 88 (draft)

date: 15. October 2008

present: A. Bertarelli (TS/MME), S. Calatroni (TS/MME), E. Ciapala (AB/RF), C. De Almeida Martins (AB/PO), M. Eshraqi (AB/ABP), L. Ferreira (TS/MME), R. Garoby (AB/BI), F. Gerigk (AB/RF), K. Hanke (AB/OP), M. Lindroos (AB/ATB), AM. Lombardi (AB/ABP), R. Losito (AB/ATB), D. Missiaen (TS/SU), M. Paoluzzi (AB/RF), M. Poehler (TS/CE), M. Schuh (AB/RF), W. Weingarten (AB/RF)

agenda

1. General news, report from LHeC workshop (Roland Garoby)
2. Status of the SPL chopper driver (Mauro Paoluzzi)
3. Past R&D on superconducting cavities at CERN (Sergio Calatroni)
4. next meeting
5. linked documents in EDMS

1. General news, report from LINAC'08 (Roland Garoby)

- **publications:** the report on the choice of the site layout for the SPL/PS2 complex is published (<http://cdsweb.cern.ch/record/1125997>), the LINAC'08 paper on the SPL is available (<http://cdsweb.cern.ch/record/1134358> and also a report by W. Weingarten on the Performance of SC cavities for the SPL. All publications are accessible from the SPL documentation page.
- **collaborations:**
 - ◆ **SNS:** is interested to work with us on their modulator design, C. De Almeida Martins will follow their developments and give advice, B. Goddard and R. Losito will follow the SNS work by Danilov on laser stripping.
 - ◆ **ESS-S:** agreement is about to be signed, 2 people which are paid by ESS-S will join the SPL team in January (job description),
 - ◆ **ESS-B:** draft agreement is being circulated now, it is likely that there will be in-kind contributions to Linac4 (e.g. drift tubes for DTL), modulators are under discussion,
 - ◆ **Triumf:** is interested in contributing SC cavities to the SPL, last discussions took place during LINAC'08. A possible contribution could consist of all $b=0.65$ cavities funded by the Canadian government. Triumf is working with a local company, which can machine the cavities but which can (at the moment) not do the electro-polishing,
 - ◆ **BNL/AES:** BNL is interested to contribute SC cavities to the SPL (LHC upgrade), which would be produced at AES. AES has already produced 5-cell cavities at 703.8 MHz, which is very close to the needs of the SPL.
 - ◆ **Project X:** R. Garoby will take part in a collaboration meeting, which takes place at the end of October.
- To organise all possible collaborations there will be a SPL collaboration meeting between the 8 and 12 December. At this occasion the basic parameters of the SPL will be communicated and the interfaces between the different contributions shall be defined.
- **Linac'14:** The IOC has accepted that CERN can apply to host the Linac'14 conference, even though this breaks the usual rhythm of the conference (2x US, EU, 2x US, Asia), Linac'12 will take place in Israel **news from Linac'08**:
 - ◆ there were a number of good review talks, e.g. on energy recovery linacs, klystrons, SC RF, and RF controls,
 - ◆ ProjectX is now departing from the strict ILC parameters, for instance they are increasing the beam current to 20 mA, which eases considerably the injection scheme into the next ring. D.

McGinnis is no longer the project leader, a new name has not yet been announced.

- ◆ SNS has reached 600 kW beam power but now facing several serious problems: e.g. i) they must be cautious not to break the mercury target, ii) the modulators are still breaking at higher duty cycles,
- ◆ JPARC: linac seems to work fine, commissioning of the main ring will start end of 2008.
- ◆ IFMIF will have a SC linac. The facility is meant to test materials or the successor of ITER and has thus to operate during the operation of ITER.

2. Status of the SPL chopper driver (Mauro Paoluzzi)

M. Paoluzzi presented [the](#) status of the chopper driver. The goal of the chopper is to create the beam time structure needed for low-loss injection into subsequent circular machines. A contract was placed with FID technology, a Russian company from St. Petersburg with commercial representation in Germany. So far one module out of 4 has been delivered to CERN, which seems good enough for Linac4 operation but which is not yet ready for operation for the SPL. Many of the specification have been achieved, notably a voltage of 670 V has been demonstrated, which is higher than it was originally specified for the SPL, and which is close to the 700 V, which were specified in the contract. There are still problems regarding the maximum repetition frequency (15 in stead of 45 MHz) and also the voltage between 2 pulses is much higher than specified (<10% instead of <2%). The company is confident that all specs can be achieved, but CERN is obliged to place an order now (for the remaining 3 modules), so that the device can still be paid on the HIPPI budget (which stops end of this year). The price for one unit is ~20 k€. This means that we accept reduced specs for Linac4 and that we would give the company more time to fulfil the SPL specs, and then place a 2nd order at some point. Alternatively one can i) go back to the topology which was developed at CERN on the basis of RF MOSFETS, ii) to combine orders with FNAL, which has placed an order with Kentech (UK). Kentech, however, seems to be several times more expensive as FID, or iii) to start a new in-house development based on the Kentech approach (stacking MOSFETS).

3. Past R&D on Superconducting cavities at CERN (Sergio Calatroni)

S. Calatroni presented [the](#) past R&D on SC cavities at CERN with the focus on electropolishing of niobium. The work on low-beta cavities took place between 1999 and 2001 using the LEP/LHC approach with Nb sputtered on Cu cavities. 8 cavities were produced plus one prototype for TRASCO. Generally one can say that the coating quality goes down with beta, because the geometry becomes less favorable for sputtering. Between 1995 and 2003 35 single-cell cavities at 1.5 GHz were coated (10x each), reaching a Q of 3×10^{10} at 20 MV/m. Altogether 15 single-cell 1.3 GHz cavities were treated between 1999 and 2001, reaching up to 40 MV/m after an additional bakeout at 100 degrees. The R&D activity on EP was started at CERN in 1999 under H. Wenninger and led for instance to the results in L. Liljes thesis in 2004. The basic principles of EP were explained and a proposal was given on how to proceed with the recently received $b=0.5$ single-cell cavity. The main item to purchase is a 200 W amplifier at 704 MHz to test the cavity and it was agreed to go ahead with the purchase (~5 kCHF). It was also agreed that it is important to master the process of EP at CERN, so that it can then be exported to industry for the series production.

4. next meeting:

19th November 2008, 9:00 in 6-2-004, and the last meeting of the year is foreseen for December, 17th in 6-2-004, 9:00

5. Linked Documents

- Advertisement of 2 SPL posts by ESS-S
- Status of the SPL chopper driver (Mauro Paoluzzi) [↗](#)
- Past R&D on Superconducting cavities at CERN (Sergio Calatroni) [↗](#)

-- FrankGerigk - 17 Oct 2008

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