

Minutes of the SPL working group

meeting no. 85

date: 14. November 2007

present: G. Bellodi, P. Bourquin, C. Carli, E. Ciapala, M. Eshraqi, R. Garoby, F. Gerigk, K. Hanke, S. Lanzone, A. Lombardi, E. Mauro, M. Paoluzzi, V. Parma, S. Ramberger, C. Rossi, R. Scrivens, M. Vretenar, R. Wegner, W. Weingarten

agenda

1. Funding, FP7 and general news (Roland Garoby)
2. A proposed SRF test infrastructure in Europe (Wolfgang Weingarten)
3. Re-assessing the SPL frequency choice (Frank Gerigk)
4. Comments and remarks
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1. Funding, FP7, and general news (Roland Garoby)

- The official budget for Linac4 is now 91.5 MCHF, including the buildings which have been adapted for high-power operation of Linac4 as SPL front-end. This means that the radiation shielding is adequate for the expected losses at SPL operation. For this reason the accelerating tunnel was lowered by 2.5 metres, so that there is enough distance (> 8 m) between the SPL accelerating tunnel and building 513 under which the tunnels will pass.
- For the SPL a funding of 2.5 MCHF over 4 years is requested. This will mainly cover the CERN contribution to the CNI part of FP7 (see R. Garobys explanation in the last SPL meeting). It is clear that external contributions are necessary. E.g. cavity production at CEA within FP7, and the possibility of collaborating with ESS should be explored.
- Sergio Calatroni from TS/MME will participate to the SPL study as link man for SC cavity technology and construction.
- On Thursday, November, 15th, the civil-engineering group led by M. Poehler will inform IT representatives of the status of the SPL work, specifically on the measures taken to ensure the radiation safety for building 513.
- There is now a SPL steering group in place (similar to the Linac4 core team), which is there to take decision quickly and to prepare the project study towards a technical design report in 2011/12.
- To respond to the questions of various parties outside CERN the discussion of the SPL frequency was re-opened by R. Garoby. First results are given in F. Gerigks talk.

2. A proposed SRF test infrastructure in Europe (Wolfgang Weingarten)

W. Weingarten presented [the](#) FP7 proposal for a SRF test infrastructure, which includes improving the capabilities of the SM18 installations. The goal is to combine and improve the existing infrastructure within European labs. CERN is proposed as the central infrastructure. The idea is to operate with a shared responsibility between the host labs (for non-project specific running costs) and the individual users (project specific costs). The total budget of the proposal (manpower + material, no consumables) is 5.8 M€. Special care was taken to give (funding-) preference to a number of universities and smaller institutes to provide testing opportunities lacking in their home institutes and ensure training for young researchers.

The proposal was started by a DESY initiative in order to prepare for the large number of cavities, which are expected to be constructed in Europe for XFEL, ILC. At CERN the same facility is needed to maintain and

repair SC cavities from the LHC. At this point the participation from ILC in the central SRF test infrastructure at CERN is not yet defined. Presently we can only make tests at CERN with 4.5 K. 2 K tests are only possible for very short periods and part of proposal is to enable 2 K operation in CW.

3. Re-assessing the SPL frequency choice (Frank Gerigk)

F. Gerigk presented various options for the SC linac, based on 352, 704, 1056, and 1408 MHz cavities (spoke at 352, elliptic otherwise). After a preliminary optimisation of the number of cells per cavity and their respective beta range it was found that all options yield almost identical linac lengths and numbers of cavities. Two of the main arguments to choose 704 MHz were i) an already existing 704 MHz RF system in Linac4 (which is no longer true, since Linac4 now only uses 352 MHz), and ii) that an increase in frequency does not necessarily increase the cavity and/or real estate gradient that can be achieved. While the latter is still true, 1408 MHz will probably allow to profit from the extensive cavity/cryo-module test series of TTF. Furthermore, the higher frequency will reduce the tunnel size due to the smaller RF distribution system.

As a sideline it was pointed out that cavities with a geometrical beta < 1 (0.92 - 0.94) are more effective for a 5 GeV machine, than the originally foreseen beta = 1.

Comments & remarks

- A. Lombardi said that there will probably not be a big difference for the beam dynamics whether one uses 704 or 1408 MHz. It is clear however, that a higher energy for the frequency jump will ease the transition. The smaller apertures at 1408 MHz may have an impact on the losses but this needs to be studied in detail. Also, a tighter RF control in Linac4 may be necessary to limit the phase and energy jitter coming from the front-end
- M. Vretenar said that Linac4 is now fully compatible with SPL operation (shielding, size of the accelerator tunnel, etc.). There is now even more space for modulators in the klystron hall, which will have to be replaced for SPL high-duty cycle operation. Following a request by R. Garoby, T. Zickler is now studying a new EMQ version, which will be used w/o cooling for Linac4 but which can be water cooled once a higher duty cycle is demanded. The presently foreseen EMQs are not cooled and cannot be used for the SPL. The difficulty is to maintain the short length, which one can have with un-cooled EMQs.

next meeting: will take place in 2008

-- FrankGerigk - 16 Nov 2007

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