1. Status of the construction of the photo-injector for the drive beam linac
   Funded by CARE

2. Status of the construction of the NEPAL beamline
   Funded by CARE

3. Project of the photo-injector for the probe beam linac
1. Status of the construction of the CTF3 photo-injector

- Modification of the technical drawings of the gun upon a CERN request due to the insertion of photo-cathode transfer chamber (August)

⇒ All the cooling channels in the gun had to be re-designed

⇒ Makes difficult to support the gun

- Finalization of the technical drawings of the NEG envelop around the gun
  Strong collaboration with CERN is mandatory since the NEG coating is done there

⇒ drawings are finished
1. Status of the construction of the CTF3 photo-injector

• Modification of the magnetic design: 2 coils instead of 3
No enough space for pumping with 3 coils
Solenoids ordered in June, one was modified in September
taking into account the data of the CERN cooling system

=> delivery of solenoids in December
1. Status of the construction of the CTF3 photo-injector

Construction of a prototype to valid HF simulations

Ordered in March . . . . . . . . . last piece received in November, 4th !!

History:
  • ordered in March to the French company DURUAL
  • test cavity received in April not satisfying
  • several tries later, order in beginning of June, foreseen delay: 2 months
  • the firm begins (we suspect) the work only in October

Set up of the HF measurement apparatus begun the 10th
Duration: 2 months but we hope to order the final gun before the end of the year
1. Status of the construction of the CTF3 photo-injector

Coupling aperture
1. Status of the construction of the CTF3 photo-injector

- First half cavity with the hole for the photo-cathode
- Central cavity
- Last cavity with coupling holes
- Cooling channels
1. Status of the construction of the CTF3 photo-injector

Ducts for NEG pumping
2. Status of the construction of the NEPAL beamline

- RF gun will be built almost in same time with the one for CTF3
- photo-cathode preparation chamber under construction in our workshop
- laser from HighQ should be delivered next month as all the optical stuff
- drawings of magnetic elements are available
- modulator is under construction

But:

New shielding to radiations is mandatory due to more severe legal threshold
=> first study implied a cost too high
=> second study under way reducing the area of the NEPAL room
civil engineering is foreseen
3. Project of a photo-injector for the probe beam linac

**Probe Beam Linac (PBPI):**

**Energy:** ~4 - 5 MeV
**Normalised r.m.s. emittance:** 20 π mm mrad <
**Energy spread:** ± 2% <
**Bunch charge:** > 0.5 nC

**Probe Beam Linac:**

**Energy:** 200 MeV
**Normalised r.m.s. emittance:** 20 π mm mrad
**Energy spread:** ± 2%
**Bunch charge:** 0.5 nC
**Number of bunches:** Variable from 1 - 64
**Bunch spacing:** 0.333 ns
**r.m.s. bunchlength:** 0.75 ps
3. Project of a photo-injector for the probe beam linac

Initial PBPI design derives from PHIN photo-injector:

- smaller Iris aperture (15 mm instead of 20 mm for PHIN).
- Cathode wall angle set to zero.
- Iris profile is circular and connexe walls are obliques.
- « upper part » of each cellule profile is rectangular. (easier to re-machine).

HF Simulations performed by Julien Brossard
3. Project of a photo-injector for the probe beam linac

Constraints less severe
Simplified design

\[
Q = 14400, \quad R_s = 7.84 \text{ M}\Omega \Rightarrow P_{HF} = 5.2 \text{ MW}
\]
for 80 MV/m

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( E ) (MeV)</td>
<td>5.35</td>
</tr>
<tr>
<td>( \sigma_r ) (mm)</td>
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<td>( \text{FWHM}_z ) (ps)</td>
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<tr>
<td>( \sigma_\gamma / \gamma ) rms (%)</td>
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<td>( \varepsilon ) ((\pi) mmmrad)</td>
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CONCLUSION

► Photo-injector for the drive beam linac
   measurements and re-machining of prototype under way
   do our best to catch up for a delivery before summer but no guaranty

► Construction of the NEPAL beamline
   Most of components will be available before the end of next year
   but incertitude on the delay to get the authorization

► Photo-injector for the probe beam linac
   HF design of the gun and coil calculations are completed
   detailed technical drawings under way
   design simpler => less problems