Ultra short bunch electron injector for AWAKE

Poster: THPLR071
AWAKE layout

- Rubidium vapor
- Plasma
- Laser pulse
- Proton bunch
- Electron bunch
Awake electron beam requirements for Run II

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Baseline</th>
<th>Run II</th>
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</thead>
<tbody>
<tr>
<td>Beam Energy</td>
<td>16 MeV</td>
<td>&gt;50 MeV</td>
</tr>
<tr>
<td>Energy spread ($\sigma$)</td>
<td>0.5 %</td>
<td>&lt; 1 %</td>
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<tr>
<td>Bunch Length ($\sigma$)</td>
<td>4 ps</td>
<td>0.1 ps</td>
</tr>
<tr>
<td>Beam Focus Size ($\sigma$)</td>
<td>250 $\mu$m</td>
<td>0.25 – 1 mm</td>
</tr>
<tr>
<td>Normalized Emittance (rms)</td>
<td>2 mm mrad</td>
<td>&lt; 10 mm mrad</td>
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<tr>
<td>Bunch Charge</td>
<td>0.2 nC</td>
<td>0.1 – 0.2 nC</td>
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</tbody>
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Plasma wave length 1.2 mm
Injector simulations

S-band gun + 12GHz bunching structure, 2ps input, 22 MV/m buncher, 80 MV/m x-band accelerator to keep bunching
Injector simulations

Emittance: 5 \(\mu\text{m}\), Bunch length: 27 \(\mu\text{m} = 90\) fs, Charge: 100 pC
End

Please come to the poster for more details and questions!
Electron source layout