TTF2 Feedbackkicker

• Specification of the kicker
• Measurement of the magnetic field inside the kicker
• Optimisation of the kicker impedance to 50 Ω
• Status and picture of the kicker
The Specification of the Feedbackkicker

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>TTF2</th>
<th>TTF1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse power</td>
<td>10kW</td>
<td>1kW</td>
</tr>
<tr>
<td>Voltage</td>
<td>700V</td>
<td>220V</td>
</tr>
<tr>
<td>Electrical strength</td>
<td>1,5kV</td>
<td>1kV</td>
</tr>
<tr>
<td>Current</td>
<td>14,2A</td>
<td>4,5A</td>
</tr>
<tr>
<td>Frequency</td>
<td>50MHz</td>
<td>50MHz</td>
</tr>
<tr>
<td>Impedance of the kicker</td>
<td>50Ω</td>
<td>50Ω</td>
</tr>
<tr>
<td>Length</td>
<td>1000mm</td>
<td>400mm</td>
</tr>
<tr>
<td>Coating material</td>
<td>Stainless steel 4.4541 (titan stabilised)</td>
<td></td>
</tr>
<tr>
<td>Coating thickness</td>
<td>700nm</td>
<td>1µm</td>
</tr>
</tbody>
</table>

**Kicker design:**
- A small reflectance factor, to match the kicker-impedance to 50Ω
- A large frequency range, to have a fast rise time
- A small reduction of the magnetic field by the sputtered chamber
- The maximum magnetic field
The Measurement of the Magnetic Field

- The goal: optimisation of the kicker geometry in order to achieve high field strength and an impedance of 50 Ω
- free parameters: geometry of the conductor
  distance between the conductor and the chamber
The Measurement of the Magnetic Field

- red curve Trigger
- green curve current on the Absorber
- yellow curve probe voltage
- max. achieved magnetic field = 225mV for the 1st prototype
- The Kicker was built in a 50 Ω geometry.
## Measurement results

<table>
<thead>
<tr>
<th></th>
<th>Conductor with a perimeter of <strong>83mm</strong></th>
<th>Conductor with a perimeter of <strong>59mm</strong></th>
<th>Conductor with a perimeter of <strong>59mm</strong> and with a hole</th>
<th>Conductor with a perimeter of <strong>20mm</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The magnetic field voltage with a Kicker Impedance of 50Ω</td>
<td>225mV</td>
<td>281mV</td>
<td>284mV</td>
<td>540mV</td>
</tr>
<tr>
<td>The maximum of the magnetic field was achieved with a minimum distance between conductor and chamber</td>
<td>309mV</td>
<td>378mV</td>
<td>284mV</td>
<td>540mV</td>
</tr>
</tbody>
</table>

**Remark:**
The measurement was done with only one conductor (no pair)
We have a reduction by the sputtered chamber of 3%
The Kicker impedance
(Measurement with a Time Domain Reflectometer)

green cure: pulse with a rise time of 17.5 ps (57GHz)
white cure: pulse with a rise time of 5ns (200MHz)
field build up time of 17.5ns
Status:
- design is finished
- Construction started
- Parts ready until 3/03
- Kicker installation after vacuum installation i.e summer 03
TTF1 Feedbackkicker

TTF2 Feedbackkicker