Bucked Coils
- Realistic VS Non-Realistic Beam -

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Bucked Coils, BC

- Trying to decrease the magnetic field at the position of the RF cavities
- BC configuration: A pair of bucked coils, followed by an RF cavity which has a LiH absorber on each side. Every pair of coils has opposite polarity than the previous pair
Bucked Coils, BC

Three different versions of BC were studied, BC-I, BC-II, BC-III. They all have the SAME configuration except for:
• the cell’s length and
• the current densities of their coils

<table>
<thead>
<tr>
<th>Lattice</th>
<th>BC-I</th>
<th>BC-II</th>
<th>BC-III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-cell Length (m)</td>
<td>2.10</td>
<td>1.80</td>
<td>1.80</td>
</tr>
<tr>
<td>Inner Coil Current Density (A/mm²)</td>
<td>90.24</td>
<td>128.10</td>
<td>99.26</td>
</tr>
<tr>
<td>Outer Coil Current Density (A/mm²)</td>
<td>120.00</td>
<td>112.80</td>
<td>132.00</td>
</tr>
</tbody>
</table>
Magnetic Field Comparison

- **FSIIA:** >4 T
- **BC-I:** 4 times lower than FSIIA
- **BC-II and BC-III:** 2 times lower than FSIIA

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Non-realistic Beam

Realistic Beam

emit4D_mm
- FSIIA_0B
- BC-I_0B
- BC-II_0B
- BC-III_0B

emit4D_mm
- FS2A
- BCI
- BCII

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Non-realistic Beam

Realistic Beam

Transmission in $A_\perp < 30$ mm

- FSIIA_new_@0B
- BC-I_Be_@0B
- BC-II_Be_@0B
- BC-III_Be_@0B

Amplitude
- FS2A
- BCI
- BCII
- BCIII

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Conclusions

• Decrease in Magnetic Field wrt FSIIA:
  – 4 times with BC-I
  – 2 times with BC-II and BC-III

• Transmission within 30 mm $A_T$ wrt FSIIA
  – Non-realistic beam:
    • BC-I 6% less transmission
    • BC-II and BC-III ~same as FSIIA
  – Realistic Beam:
    • BC-II best transmission
Future work

• Keep working/trying to improve Bucked Coils more
• Focus on 6D-cooling