Tolerances in the Undulator

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XFEI Beam Dynamics Meeting

23.01.06
Assumptions

- Beam with $\varepsilon_n = 1$ mm mrad, 17.5 GeV, $<\beta_{\text{und}}>$ ≈ 30 m
• We claim around $0.1 \sigma$ is okay:
  – $3 \mu m$ trajectory amplitude
  – $0.1 \mu rad$ trajectory angle

• Required only for distances in the order of a gain length? 

Can this be relaxed?
• Pointing stability important, again we claim $0.1 \sigma$
• Required only for the last section of the undulator?
• Absolute value not important, but jitter is!
• Is $0.1 \sigma$ sufficient?
## Summary

<table>
<thead>
<tr>
<th></th>
<th>SASE</th>
<th>USER</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x_{rms}$</td>
<td>3 μm</td>
<td></td>
</tr>
<tr>
<td>$x'_{rms}$</td>
<td>0.1 μrad</td>
<td>0.1 μrad</td>
</tr>
<tr>
<td>Timing</td>
<td></td>
<td>Measured to an accuracy &lt; 30 fs</td>
</tr>
</tbody>
</table>

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