Downstream Systems and The Proton Driver

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Bunch Train Timing

\[ T_0 \]

\[ T_1 \]
Overall Repetition Rate \( (T_0) \)

- Like lower: average power requirements reduced
- Like higher: beam loading reduced in RLA/FFAG cavities
Number and Timing of Sub-Bunches

- More sub-bunches reduce beam loading without increasing average power requirements significantly.
- However, must increase peak power to top off RF between bunches.
- For 4 MW, 50 Hz, 10–20 GeV FFAG, 1 MW into input coupler, 17 MV/m

<table>
<thead>
<tr>
<th>Bunch trains</th>
<th>Time for full train</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>112 $\mu$s</td>
</tr>
<tr>
<td>3</td>
<td>149 $\mu$s</td>
</tr>
<tr>
<td>4</td>
<td>168 $\mu$s</td>
</tr>
<tr>
<td>5</td>
<td>179 $\mu$s</td>
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</tbody>
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