Your Design Task

Make a green field accelerator design!

- Top level parameters given (each group will focus one of six different parameter sets).

- Choose beam energy, beam current, RF frequency(ies) and power sources, type of accelerator structure, RF gradients and transition energies, NC or SC, linac vs ring, power source(s), type of lattice(s), etc

- Chose your favorite green field

Make a presentation at the end of the course.

- Imagine you are selling your design to the funding agency.
1 – Short pulse neutron source

**Pulse length:** ~1 us

**Repetition rate:** 50-60 Hz

**Average beam power:** ~1.5 MW

**Beam energy:** 1-8 GeV

**Particle type:** p or H-
2 – Long pulse neutron source

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse length</td>
<td>2-3 ms</td>
</tr>
<tr>
<td>Repetition rate</td>
<td>10-20 Hz</td>
</tr>
<tr>
<td>Average beam power</td>
<td>~5 MW</td>
</tr>
<tr>
<td>Beam energy</td>
<td>1-8 GeV</td>
</tr>
<tr>
<td>Particle type</td>
<td>p or H-</td>
</tr>
</tbody>
</table>
3 – CW Neutron Source

Pulse length: CW
Average beam power: ~1.5 MW
Beam energy: 0.5 - 4 GeV
Particle type: p or H-
### ADS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse length</td>
<td>CW</td>
</tr>
<tr>
<td>Average beam power</td>
<td>10 MW</td>
</tr>
<tr>
<td>Beam energy</td>
<td>1-2 GeV</td>
</tr>
<tr>
<td>Particle type</td>
<td>p or H-</td>
</tr>
</tbody>
</table>

Very low trip rate?
5 – Neutrino Source

Pulse length: 5 bunches of 3ns each
Repetition rate: 50-60Hz
Average beam power: ~4 MW
Beam energy: 2-8 GeV
Particle type: p or H-
6 – Radioactive Ion Beams

Pulse length: CW
Average beam power: ~0.5 MW (for p)
Beam energy: 0.4 - 1 GeV/u (for p)
Particle type: p to U
A suggested way to start

- Study similar facilities
  - Understand the reasoning behind design choices
  - Were any choices site-specific, political, and/or historical?
  - Consider alternatives
  - Be creative (but be prepared to defend your choices)
- Make use of the lectures (and lecturers)
  - Take the opportunity to ask questions