AD (and ELENA) beam commissioning status
AD/ELENA restart in 2021

- **HW test (AD ring in closed mode) – 4 weeks:**
  - Power converters, Rf cavity, Kickers, instrumentation, etc...
  - => started on time, but extended till restart with beam
- **AD target conditioning with beam + dogleg recommissioning – 2 weeks**
  - => Beam on target 25th June as planned, but some activities postponed
- **AD ring beam commissioning – 4 weeks**
  - Stochastic cooling - 1 week
  - All RF (HL and LL) – 2 weeks
  - E-cooler + cycle optimization – 1 week
  - => Beam in AD 5th of June as planned, but...
- **ELENA ring + TL commissioning with pbar – 3 weeks**
  - => not yet started, but good shape with Hminus commissioning
HW problems

In AD:
- Vacuum leak in stochastic cooling kicker tank after bake-out:
  - Same symptoms and same solution adopted as in 2000
- Short circuit in one module of the injection kicker:
  - Identified too late to fix it (need to take out the kicker form the ring)
  - Operating with only 5 out of 6 tanks with nominal kick strength but no margin in case of trip
- Several stochastic cooling amplifiers not operational
  - Same operating condition as 2018
  - To be fixed during the TS, when spares repaired

In ELENA:
- BTV screen in LNI not operational
  - Decided not to open vacuum in the kicker region to replace it
  - Will use the profile monitors
Reasonable injected intensity for a restart:
- 3e7 pbar injected

Beam decelerated to 300 MeV, not yet to 100 MeV
- Beam lost around 105 MeV in 100 turns (~10 ms)

After some trouble at the restart, stochastic cooling operational at 3.5 GeV and 2 GeV

Electron cooling set-up at 300 MeV:
- Profiting of the renovated electron trajectory measurement system

To be done:
- Commissioning of the RF controls system, extraction synchro:
  - Newly installed system
  - E-cooling setting-up at 100 MeV
- ELENA is well prepared and optimized with Hminus to receive the pbars.
  - Is is far better prepared than anybody could hope thanks to intensive efforts to have the H-source running
  - Could accelerate the Hminus to mimic the pbars cycle
  - Electron cooling setting-up also done with H-beam
- Transfer lines commissioning done with Hminus:
  - Optics measurements, steering on the last monitor
- To be done:
  - Transfer line stability with experimental magnets ON

ELENA beam progress
- 2 bunches in LNE00
- 1 bunch in LNE50
- 1 bunch not extracted
Pbar-like nominal cycle

e-cooling

4 bunches distribution
ADC operation mode in 2021

- 2 decelerators to operate with the same team:
  - 1 machine supervisor for the week + 1 operator during working hours in ACR
  - PS operators reduced at 2 instead of 3 for nights and week-end
- ELENA will serve up to 4 different users per cycle:
  - no more 8 hours shift period dedicated to 1 user
  - If not more than 4 users, can get beam 24/7
  - You will share the same machine settings
- ELENA cycle and AD will need Machine development time to be optimized
  - Request to have 1 shift (8 hours) per week for MD in 2021
End line operation

- Setting-up of the shared beam line by OP, each users can get control of the last “private” elements:
  - Control of the IN/OUT profile monitors + end line steering
  - Can provide knobs to adjust offset and angle on agreed hand-over point
    - Tested with Gbar and ALPHA
ELENA Beam Request Server (BRS)

- Manage the ELENA sequencing
  - Schedule (Add or Remove cycle(s))
  - Prioritize cycles (production vs spare)
  - Cycles With or Without beam
  - Beam Destinations
  - Pauses
  - Status

- Interface between the Operators and the ELENA Central Timing

- Now
  - Destinations selection done by the control room
  - Validation of the Alpha needs with the full Pbar production path (PS-ADE-ELENA)

- During the year
  - Remote destinations selection thru a REST service
  - If validation OK then deploy Alpha needs

Courtesy of Sergio Pasinelli
• Cycle by cycle, depending on the destination’s requests, the position of the bunch in the bunch train can be different for experiment (Hardware limit on the fast delector).

<table>
<thead>
<tr>
<th>Destinations</th>
<th>Possible bunch position in the train</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aegis</td>
<td>1</td>
</tr>
<tr>
<td>Atrap1</td>
<td>1 or 2</td>
</tr>
<tr>
<td>Atrap2</td>
<td>1 or 2 or 3</td>
</tr>
<tr>
<td>Alpha</td>
<td>1 or 2 or 3 or 4</td>
</tr>
<tr>
<td>Asacusa1</td>
<td>1 or 2 or 3 or 4</td>
</tr>
<tr>
<td>Asacusa2</td>
<td>1 or 2 or 3 or 4</td>
</tr>
<tr>
<td>Base</td>
<td>1 or 2 or 3 or 4</td>
</tr>
<tr>
<td>Gbar</td>
<td>1</td>
</tr>
<tr>
<td>Puma</td>
<td>1 or 2</td>
</tr>
</tbody>
</table>
AD beam commissioning is progressing well, but late compared to initial (optimistic!) planning:
- Slow restart of the systems after dismantling (Stochasite cooling) or renovation (LLRF) during LS2
- Problem of experts availability

We are using the recommissioning time of ELENA:
- Hope to recover as ELENA H-commissioning progressed beyond expectation

AD beam performance not yet nominal at injection:
- 3/4 of the end of 2018 intensity, could hope 2/3 extracted
- To be seen with ELENA 2018 performance

Optimization may have to be done in parallel of physics

Summary

2021 will be a very short Physics Run, we will do our best to provide good quality pbars beam as soon as possible