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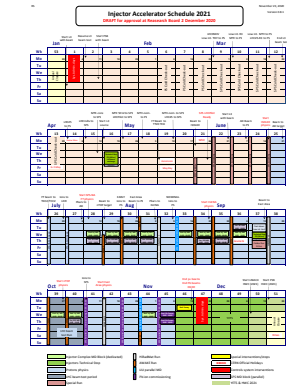



# Final DRAFT 2021 Injector Schedule

Rende Steerenberg, BE-OP

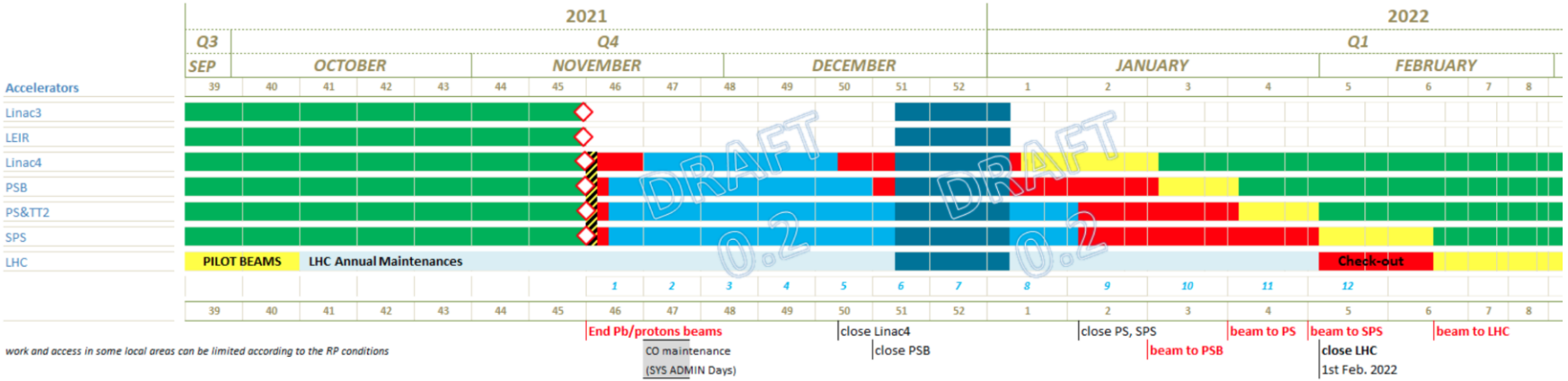
With acknowledgements to all those who provided input

*EDMS: 2442568 v.0.8.1*

# Main Reasons for the Update

- Include outcome from October SPSC
- Include outcome Management – LHC Exp. meeting of 23 October
  - Confirmation 2021 LHC beam test
  - Anticipation of 2021 end of run by 4 weeks, to allow for short YETS 2021-2022
  - Maintain date first beam LHC – week 6 2022
- Include feedback received on previous versions

# DRAFT YETS 2021 – 2022 Schedule

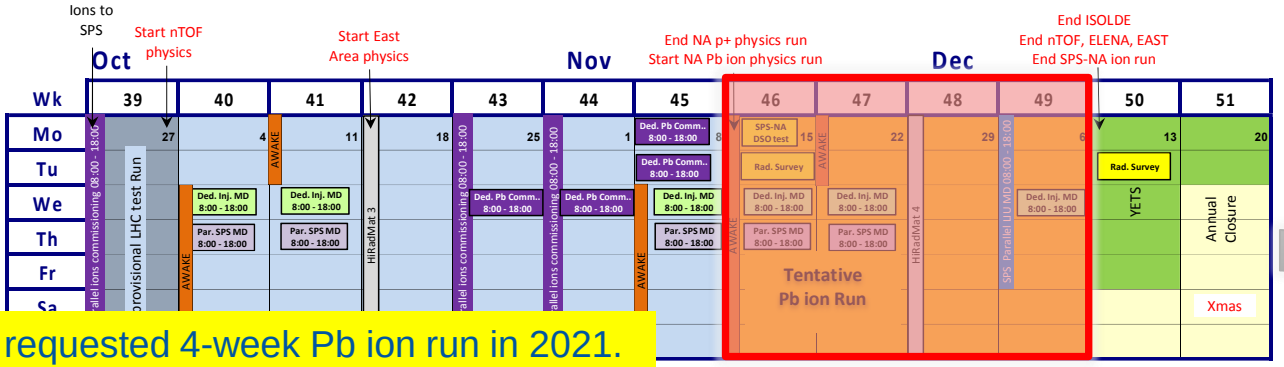



*Courtesy of J. Coupard*

EDMS 2439145 - version 0.2

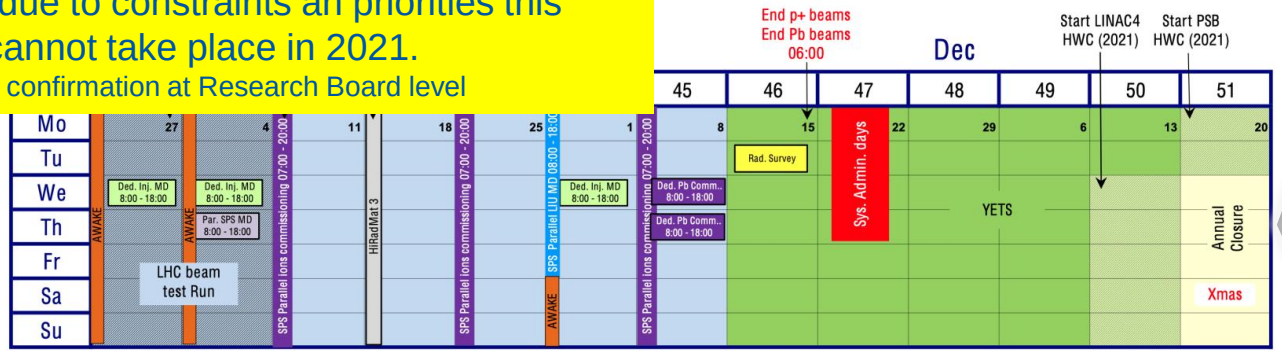
# Main change on Draft 2021 Injectors Schedule

2021 – Q4
Version 0.6

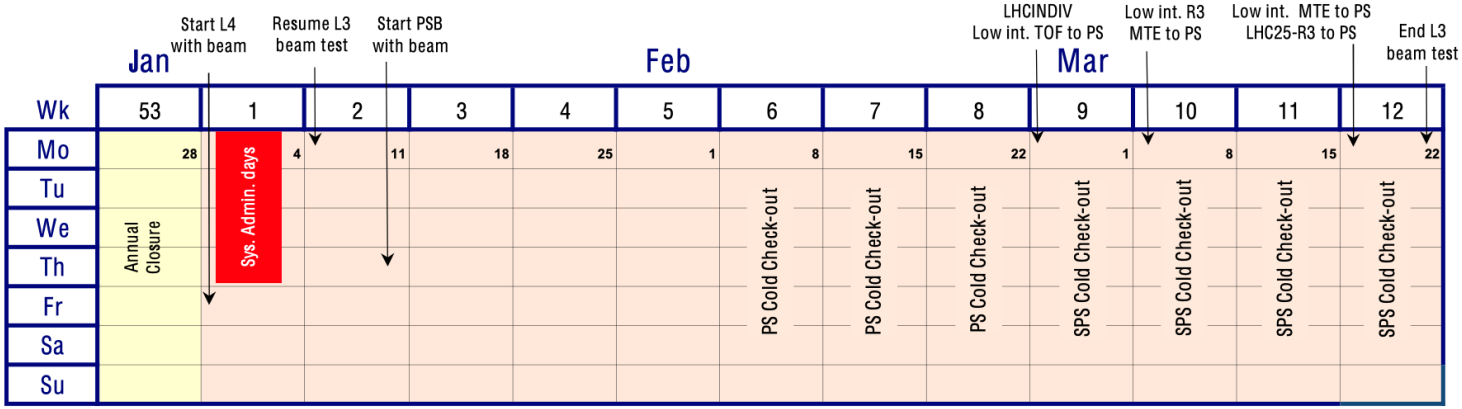



NA61/SHINE requested 4-week Pb ion run in 2021.
However, due to constraints an priorities this cannot take place in 2021.
Final confirmation at Research Board level

2021 – Q4
Version 0.8.1

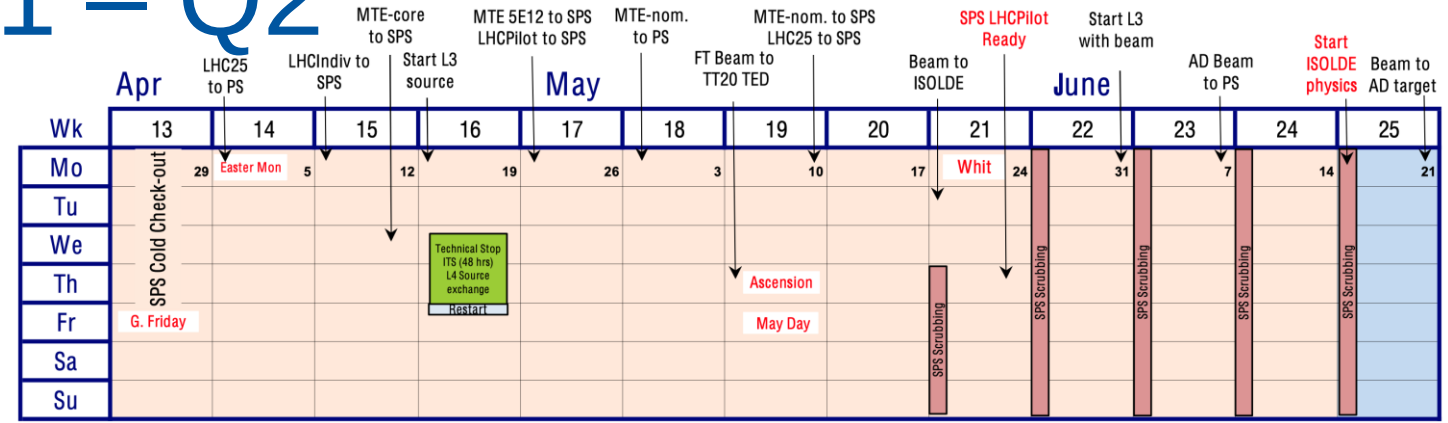


# 2021 – Q1



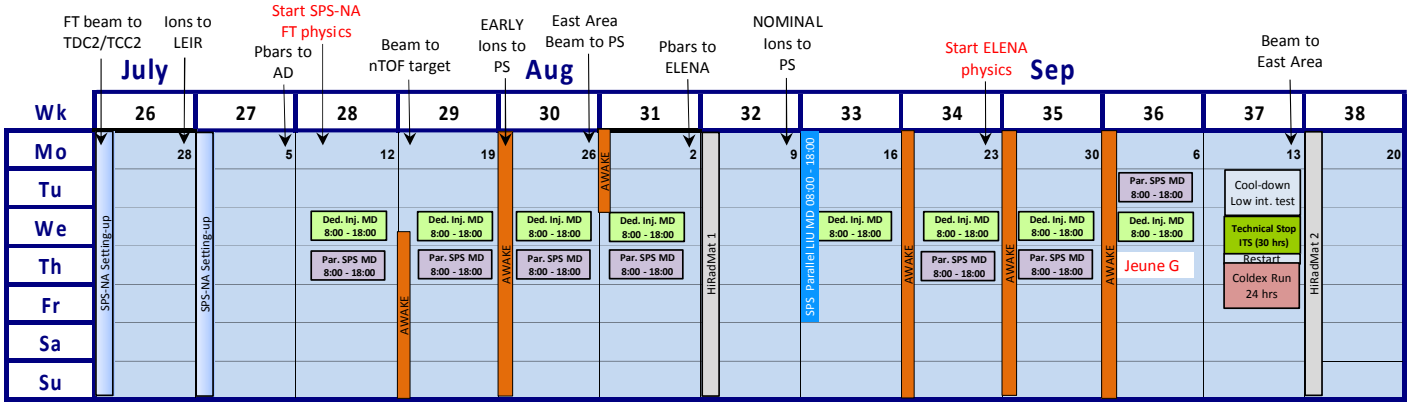

- Wk 1: Fast restart after Xmas break
- Wk 1: Start with 4-day System Administration - Control System maintenance/updates
- Wk 1: Start Linac 4 with beam on Fri. 8 January - *L4 source will start earlier*
- Wk 2: Beam to PSB Thu. 14 January
- Wk 9: First beams from PSB to PS for beam commissioning on Mon. 1 March

# 2021 – Q2



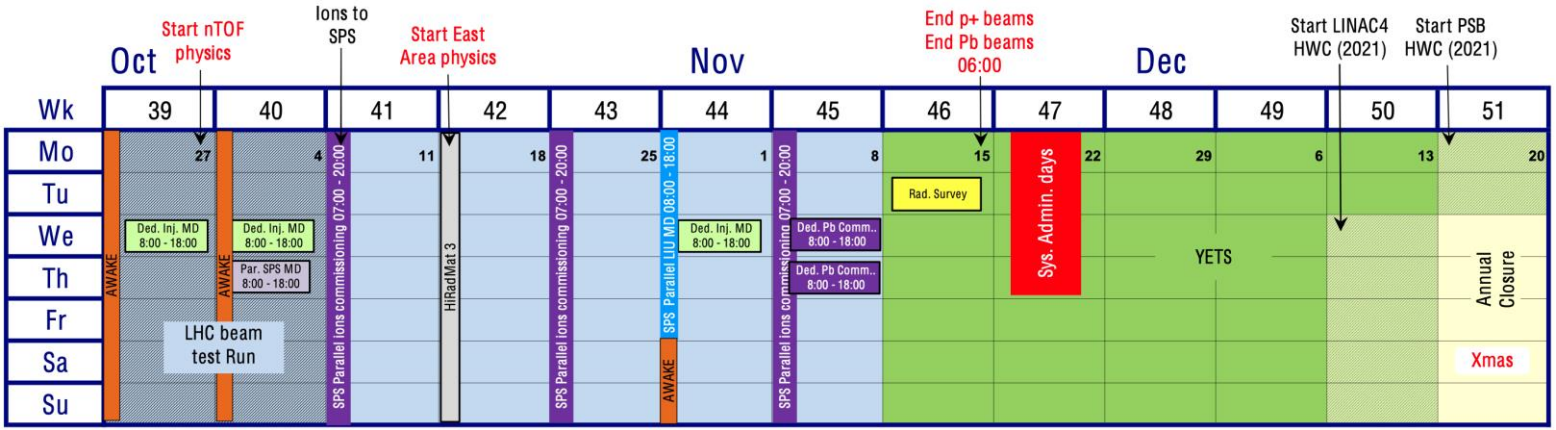

- Wk 16: Start Linac 3 source with Pb ions
- Wk 16: 48 hours Linac 4 source exchange beam to beam & Injector Technical Stop - *moved from wk 17, duration and start time tbd*
- Wk 21: LHCPilot beam ready on 27 May out of SPS – *LIU milestone*
- Wk 21 – 25: Scrubbing run SPS interleaved with commissioning activities and COLDEX running
  - Wk 25: Part-time beam delivery to SPS-NA for setting-up interleaved with scrubbing
- Wk 22: Start Linac 3 beam commissioning
- Wk 25: 21 June start ISOLDE physics
- Wk 25: Beam to AD target for new target area commissioning (2 weeks)

# 2021 – Q3




- Wk 26 & 27 Setting-up SPS-NA – Part-time scrubbing in week 26
- Wk 26: 28 June, Pb ions to LEIR for ion chain commissioning
- Wk 27: 5 July, Antiprotons from AD target area to AD Ring
- Wk 28: Start SPS NA proton physics
- Wk 29: Beam to the new nTOF target for commissioning
- Wk 29 - 31: AWAKE run 1 - *generally 2 shifts per day*
- Wk 32: HiRadMat run 1 - *generally (extended) day time only*
- Wk 33: 5-day parallel LIU MD block – 08:00 until 18:00
- Wk 34: Start ELENA physics
- Wk 34 – 36: AWAKE run 2 - *generally 2 shifts per day*
- Wk 37: Injectors Technical Stop 30 hours
  - Preceded by cooldown, followed by COLDEX run
- Wk 38: HiRadMat run 2 - *generally (extended) day time only*

# 2021 – Q4




- Wk 39: Start nTOF physics
- Wk 39 - 41: LHC beam test time window ( 7 days with beam)
- Wk 39 – 41: AWAKE run 3 - *generally 2 shifts per day*
- Wk 41, 43, 45: SPS Pb ion commissioning – 07:00 until 20:00
- Wk 42: Start PS East Area physics
- Wk 42: HiRadMat run 3 - *generally (extended) day time only*
- Wk 44: 5-day parallel LIU MD block – 08:00 until 18:00
- Wk 44: 2-day AWAKE run - *generally 2 shifts per day*
- Wk 46: Monday 15 Nov. at 06:00 Stop of all beams
- Wk 47: 4-day System Administration (for 2022)
- Wk 50: Start Linac 4 hardware commissioning (2022)
- Wk 51, Start PSB hardware commissioning (2022)
  - 2-day HWC, due to efficiency, to be revisited

# Present Physics Accounting

| Experimental facility | 2021 | | | 2018 | 2017 |
|---|---|---|---|---|---|
| | Start Physics | End Physics | Duration [days] | Duration [days] | Duration [days] |
| ISOLDE | 21.06.2021 | 15.11.2021 | 147 | 217 | 224 |
| SPS North Area $p^+$ | 12.07.2021 | 15.11.2021 | 125 | 217 | 168 |
| AD/ELENA | 23.08.2021 | 15.11.2021 | 98 | 189 | 231 |
| nTOF | 27.09.2021 | 15.11.2021 | 49 | 224 | 217 |
| PS East Area | 18.10.2021 | 15.11.2021 | 26 | 252 | 217 |
| SPS North area Pb ions | - | - | 0 | 28 | 42 |
| AWAKE | - | - | 51 | 91 | 83 |
| HiRadMat | - | - | 21 | 20 | 35 |

- MDs,TS, reduced duty cycles, etc. are not taken into account
- Changes with respect to version 0.6 in red

# Present Accounting MD, Commissioning, etc.

| MD / Setting-up | 2021 | | | 2018 | | 2017 | |
|---|---|---|---|---|---|---|---|
| | Duration [days] | Duration [hours] | | Duration [hours] | | Duration [hours] | |
| Dedicated SPS MD | 11 | 110 | **190** | 257 | 507 | 312 | 312 |
| Parallel MD (regular) | 8 | 80 | | 250 | | - | |
| Parallel LIU MD blocks | 10 | 100 | **100** | - | - | - | - |
| Parallel Ion commissioning | 21 | 273 | **293** | - | - | - | - |
| Dedicated Ion commissioning | 2 | 20 | | - | | | |
| COLDEX | 1 | 24 | **24** | 48 | 48 | 72 | 72 |
| Low intensity test | 1 | 24 | **24** | 40 | 40 | 96 | 96 |
| **Total:** | **54** | **631** | | 595 | | 480 | |
| SPS physics run length | 18 weeks | | | 35 weeks | | 32 weeks | |

# Next Steps

- Integrate further feedback
- Insert final schedule in ASM – *Accelerator Schedule Management*
- Establish basic super cycles – *duty cycle*
  - Make clear what duty cycle experiments can expect during the physics run
  - Calculate hours of 2021 physics more precisely
  - Establish intensity forecasts curves (KPI)
- Present final draft at Research Board on 2 December for approval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# Draft 2021 Injectors Schedule

- Version 0.8.1
- 23 November 2020

https://edms.cern.ch/document/2442568/0.8.1