Summary of the Hall D Fall 2019/Spring 2020 run

A. Deur
Jefferson Lab

Disclaimer: information in small fonts are not meant to be read. They are here for future reference.

Summary of the Hall D Fall 2019/Spring 2020 run

A. Deur
Jefferson Lab

Fall 2019/Spring 2020 run plan: https://halldweb.jlab.org/wiki/index.php/Run_Coordination_Meetings:Fall2019_Run

Fall 2019 run coordinator summaries: https://halldweb.jlab.org/hdops/wiki/index.php/Summary_Fall_2019_Run
Spring 2020 run coordinator summaries: https://halldweb.jlab.org/hdops/wiki/index.php/Summary_Spring_2020_Run

Run period summaries: https://halldweb.jlab.org/hdops/wiki/index.php/Hall_D_Runs

Fall 2019 run

Initial schedule:

1. Nov. 18th - 24th: Electron beam restoration.

2. Nov. 25th - Dec. 19th: Finalized DIRC Commissioning;
   Take GlueX production data;
   High rate DAQ/cDAQ/trigger commissioning;
   Tagger accidental test, CPP test, other tests.

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Leadership: C. Meyer/J. Stevens, E. Chudakov/E. Smith

Run Coordinators:

Nov 18th-Nov 24th: 7 days: Alexandre Deur (accelerator restoration)
Nov 24th-Dec 4th, 11 days: Alexandre Deur
} https://halldweb.jlab.org/wiki/index.php/Run_Coordinator_report:_Fall_2019_w1-2

Dec 4th-Dec 11th, 7 days: Naomi Jarvis https://halldweb.jlab.org/wiki/index.php/Run_Coordinator_report:_Fall_2019_w3

Dec 11th-Dec. 18th, 10 days: Wenliang Li https://halldweb.jlab.org/wiki/index.php/Run_Coordinator_report:_Fall_2019_w4

Dec 18th-Dec. 20th, 3 days: Alexandre Deur https://halldweb.jlab.org/wiki/index.php/Run_Coordinator_report:_Fall_2019_w5

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Physics Division Liaisons: Benedikt Zihlmann/Lubomir Penchev.

Analysis Coordinator: Alexander Austregesilo.

Run coordination, subsystem status, data quality monitoring, offline analysis are discussed at daily RC meetings (8:45am, counting house).

Fall 2019 run

Actual schedule:

1. Nov. 18th - 24th: Electron beam restoration. ← Dec. 3rd (due mainly to leak in North linac)
2. ~~Nov. 25th~~ - Dec. 19th: Finalized DIRC Commissioning; ← Dec. 4th
   Take GlueX production data;
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   ~~Take GlueX production data;~~
   High rate DAQ/cDAQ/trigger commissioning;
   ~~Tagger accidental test, CPP test, other tests.~~

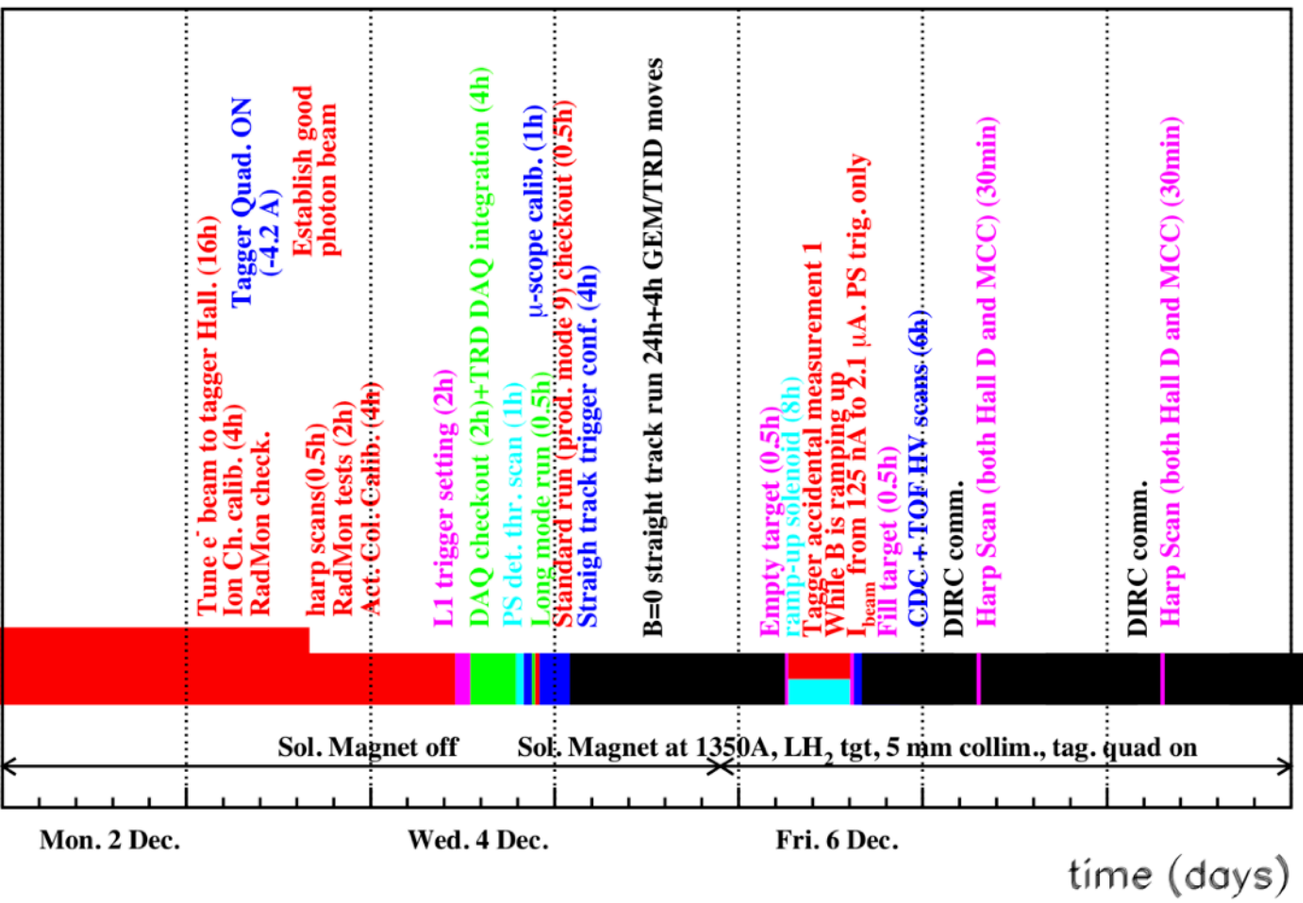
Fall 2019 run configuration

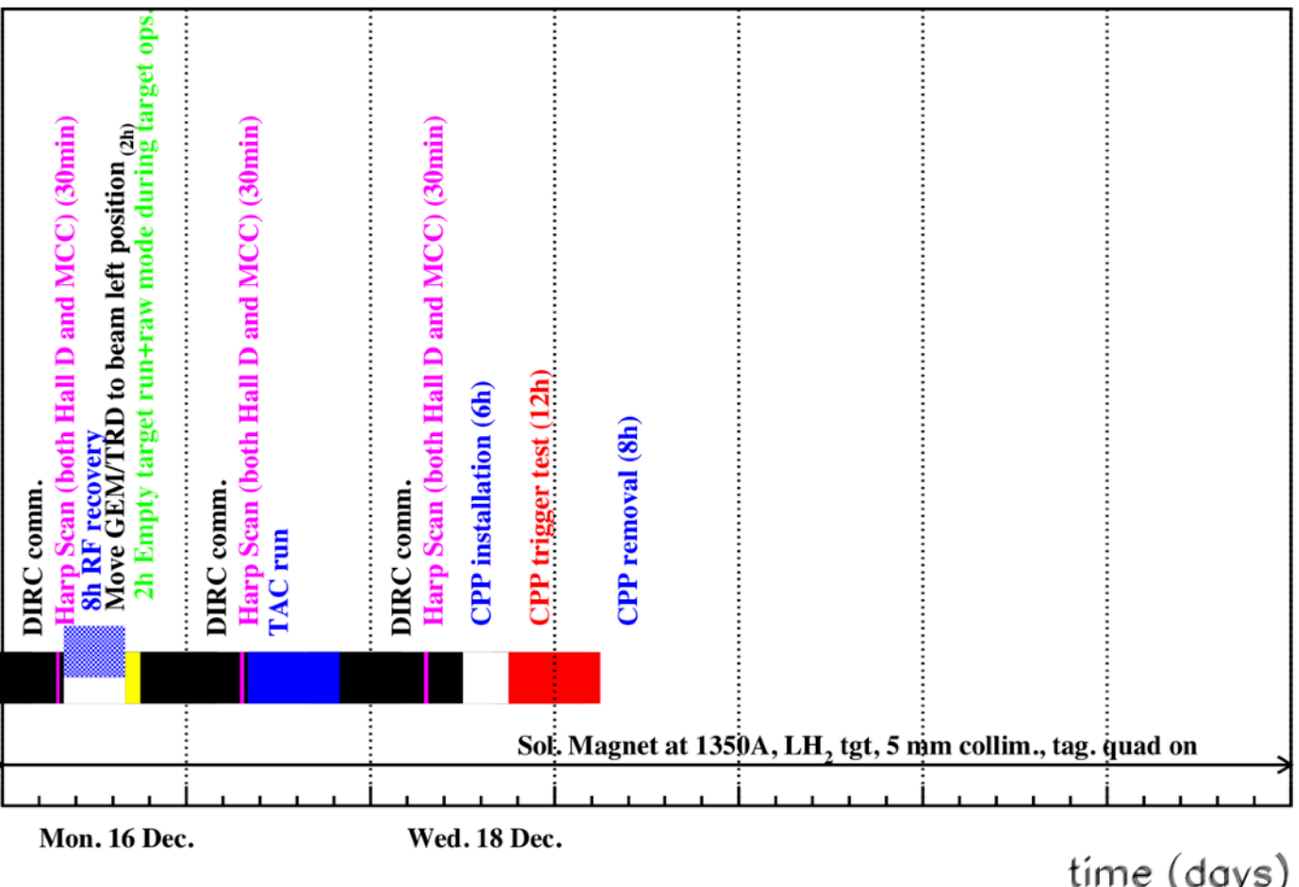
- Energy: 11.6 GeV
  - 4-hall ops, 1-pass for Hall A, 5-pass for Hall B, 3-5 pass for Hall C. D: 5.5-pass. High currents for A & C.
- Hall D configuration:
  - Both DIRC box sets installed.
  - Solenoid at 1350A.
  - Rep. rate 250 MHz.
  - Slit shared with C (as in Fall 18 and Spring 19. It was with B in Fall 17 and A in Spring 18)
  - Beam current 1 nA-2.1 μA.
  - Production Radiator: Start on Amorphous. Then 47 μm J70-105 diamond (already used during F2018 run).
  - 5mm collimator hole;
  - LH_2 target.
  - GEM/TRD detectors in front on DIRC for extra-tracking
  - TPol on during DIRC runs for systematic studies, with 75 μm TPol convertor.

Fall 2019 run configuration

- Energy: ~~11.6~~ 11.4 GeV
  - 4-hall ops, 1-pass for Hall A, 5-pass for Hall B, 3-5 pass for Hall C. D: 5.5-pass. High currents for A & C.
- Hall D configuration:
  - Both DIRC box sets installed.
  - Solenoid at 1350A.
  - Rep. rate 250 MHz.
  - Slit shared with C (as in Fall 18 and Spring 19. It was with B in Fall 17 and A in Spring 18)
  - Beam current 1 nA-~~2.1~~ 0.45 μA.
  - Production Radiator: Start on Amorphous. Then 47 μm J70-105 diamond (already used during F2018 run).
  - 5mm collimator hole;
  - LH_2 target.
  - GEM/TRD detectors in front on DIRC for extra-tracking
  - TPol on during DIRC runs for systematic studies, with 75 μm TPol convertor.

Fall 2019 runplan



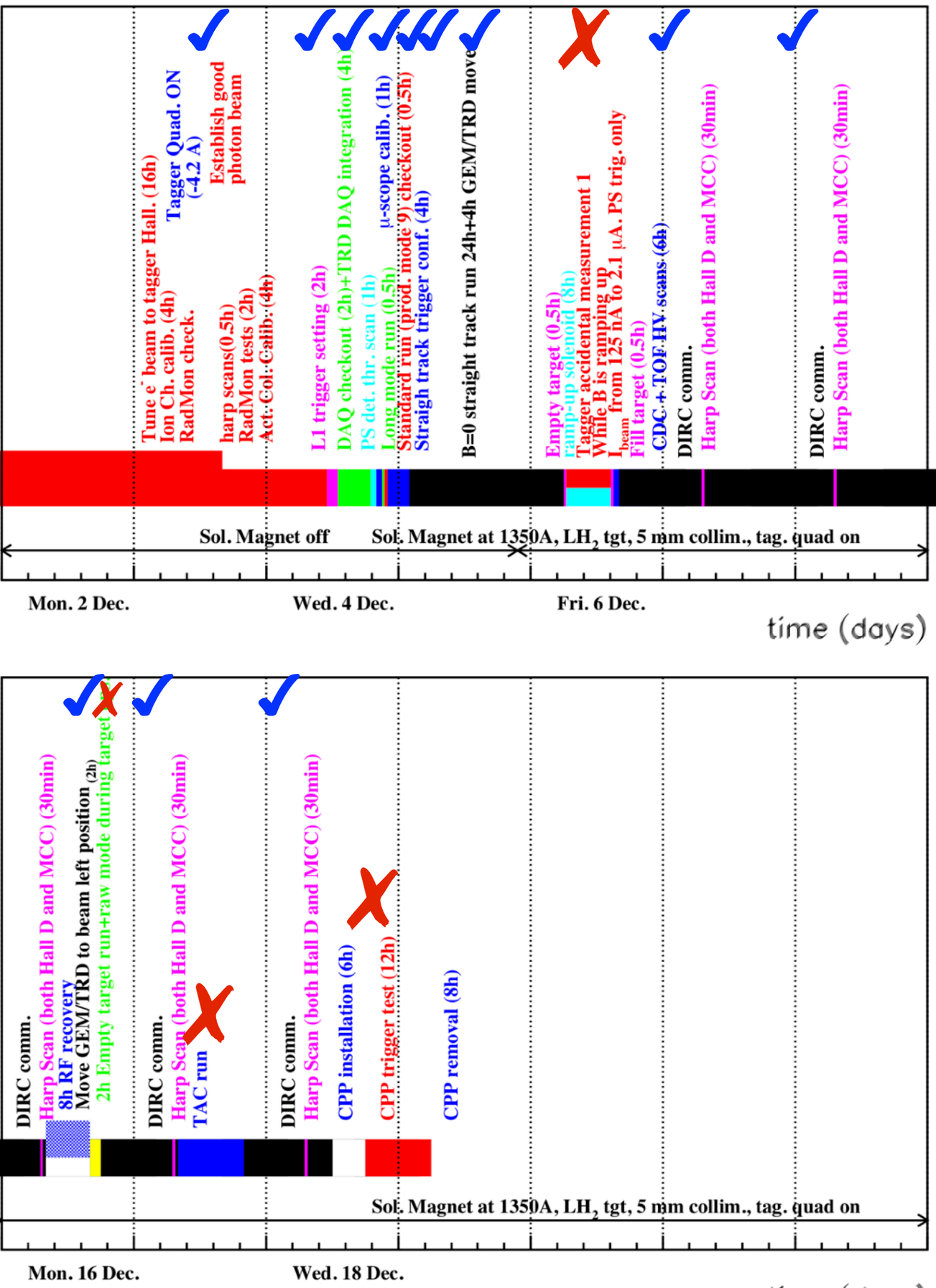


: DIRC commissioning

Final runplan, accounting for late start.
2 weeks of physics beam
GlueX prod. goal already removed

A. Deur. GlueX collaboration meeting. 02/13/2020

Fall 2019 runplan



: DIRC commissioning

Final runplan, accounting for late start.
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A. Deur. GlueX collaboration meeting. 02/13/2020

Fall 2019 runplan

- Straight track runs for each of the 3 positions of GEM/TRD
- DIRC commissioning (with TRD/GEM)
- Align diamond (JD-70-105)
- GlueX production
- TAC run
- Empty target run
- DAQ tests:
  - Test new CODA at up to 450 nA
  - cDAQ at up to 450 nA
  - Data consistency check (non-invasive)
- Trigger tests:
  - FCal-BCal-ST trigger test
  - Preparation for high current DAQ test
- HV scans for TOF's new counters
- Tagging accidentals beam tests
- ComCal test: anode current studies with special trigger
- Pair. Spec. test area (non-invasive tests):
  - Right arm (facing downstream): FCal Pb-W cristal quality and detector checks
  - Left arm:
    - EIC/Hall C aerogel tests.
    - Test of Hall C 3×3 block glass-scintillator prototype
- CPP trigger tests

Fall 2019 runplan

- Straight track runs for each of the 3 positions of GEM/TRD ✓
- DIRC commissioning (with TRD/GEM) ✓ (6B triggers for DIRC commissioning configurations; 18M triggers (6M for each location) for Gem/TRD-DIRC test)
- Align diamond (JD-70-105) ~✓ (only two directions aligned)
- GlueX production ~✗ (took 3h of data at 350nA, i.e. in GlueX-II condition) ⟹ Good shape for GlueX-II production in spring 2020
- TAC run ✓
- Empty target run ✗
- DAQ tests:
  - Test new CODA at up to 450 nA ✓
  - cDAQ at up to 450 nA ✓
  - Data consistency check (non-invasive) ✓
- Trigger tests:
  - FCal-BCal-ST trigger test ✓
  - Preparation for high current DAQ test ✓
- HV scans for TOF's new counters ✓
- Tagging accidentals beam tests ✗
- ComCal test: anode current studies with special trigger ✗
- Pair. Spec. test area (non-invasive tests):
  - Right arm (facing downstream): FCal Pb-W cristal quality and detector checks ✓
  - Left arm:
    - EIC/Hall C aerogel tests. ✓
    - Test of Hall C 3×3 block glass-scintillator prototype ✓
- CPP trigger tests ~✗ (did useful "pre-CPP" test)

Statistics for Fall 2019 run

Scheduled run time: 600h (24 days): Nov 25th-Dec 20th
Acceptable beam used: 192h
$\Rightarrow$ Running efficiency for Fall 2019 period: 32%

Due to late start

Spring 2020 run (currently ongoing)

Initial schedule:

1. Jan. 3rd - 9th: Electron beam restoration.
2. Jan. 10th -May 6th: GlueX-II production data;
   Tagger accidental test, ComCal anode test.

Spring 2020 run (currently ongoing)

Initial schedule:

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2. Jan. 10th -May 6th: GlueX-II production data;
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Leadership: C. Meyer/J. Stevens, E. Chudakov/E. Smith

Run Coordinators:

- Jan 3rd-Jan 9th: 7 days: Alexandre Deur (accelerator restoration)
- Jan 9th-Jan 15th, 7 days: Alexandre Deur
- Jan 15th-Jan 22nd, 7 days: Jonathan Zarling https://halldweb.jlab.org/wiki/index.php/Run_Coordinator_report:_Spring_2020_w3
- Jan 22nd-Jan 29th, 7 days: Alexander Austregesilo
- Jan 29th-Feb 5th, 7 days: Alexander Ostrovidov https://halldweb.jlab.org/wiki/index.php/Run_Coordinator_report:_Spring_2020_w5
- Feb 5th-Feb 12th, 7 days: Daniel Lersch
- Feb 12th-Feb 19th, 7 days: Richard Jones
- Feb 19th-Feb 26th, 7 days: Colin Gleason
- Feb 26th-March 4th, 7 days: Wenliang Li
- March 4th-March 11th, 7 days: TBD 😕
- March 11th-March 18th, 7 days: Richard Jones
- March 18th-March 25th, 7 days: Mark Dalton
- March 25th-Apr 1st, 7 days: Werner Boeglin
- Apr 1st-Apr 8th, 7 days: TBD 😕
- Apr 8th-Apr 15th, 7 days: Naomi Jarvis
- Apr 15th-Apr 22nd, 7 days: Kenneth Livingston
- Apr 22nd-Apr 29th, 7 days: TBD 😕
- Apr 29th-May 6th, 7 days: TBD😕

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Initial schedule:

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Run coordination, subsystem status, data quality monitoring, offline analysis are discussed at daily RC meetings (8:45am, counting house).

Spring 2020 run (currently ongoing)

Actual schedule: Jan. 7th (due to short break between Fall and spring runs: RF stayed on, babysitted by dedicated MCC ops)

1. Jan. 3rd - ~~9th~~: Electron beam restoration.
2. Jan. ~~10th~~ -May 6th: GlueX-II production data;
   Tagger accidental test, ComCal anode test.

Jan. 8th

Spring 2020 run configuration

- Energy: 11.4 GeV
  - 4-hall ops, 1-pass for Hall A, 1-5 pass for Hall B, 1-5 pass for Hall C. D: 5.5-pass. High currents for A & C.
- Hall D configuration:
  - Both DIRC boxes
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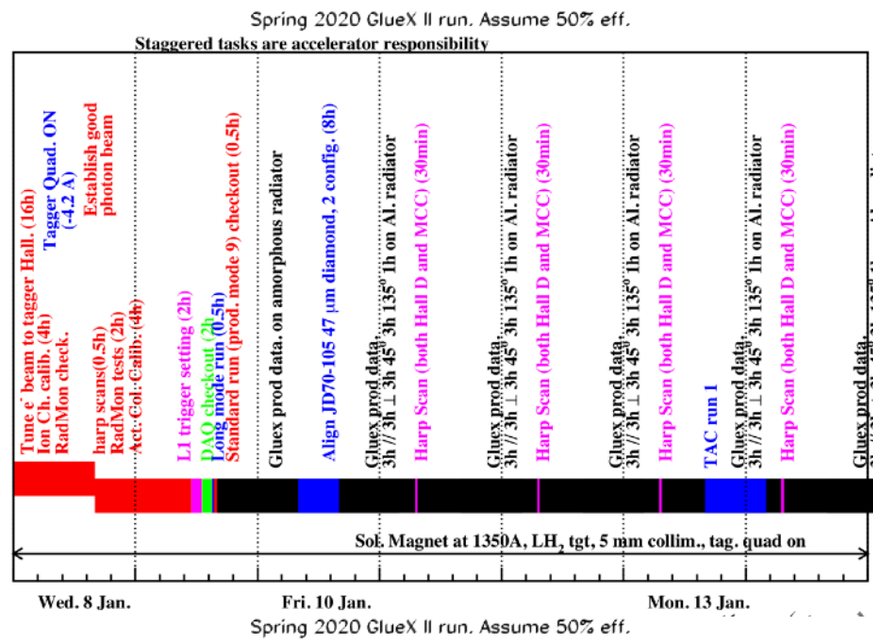
  - LH_2 target.
  - TPol with 75 μm TPol convertor.

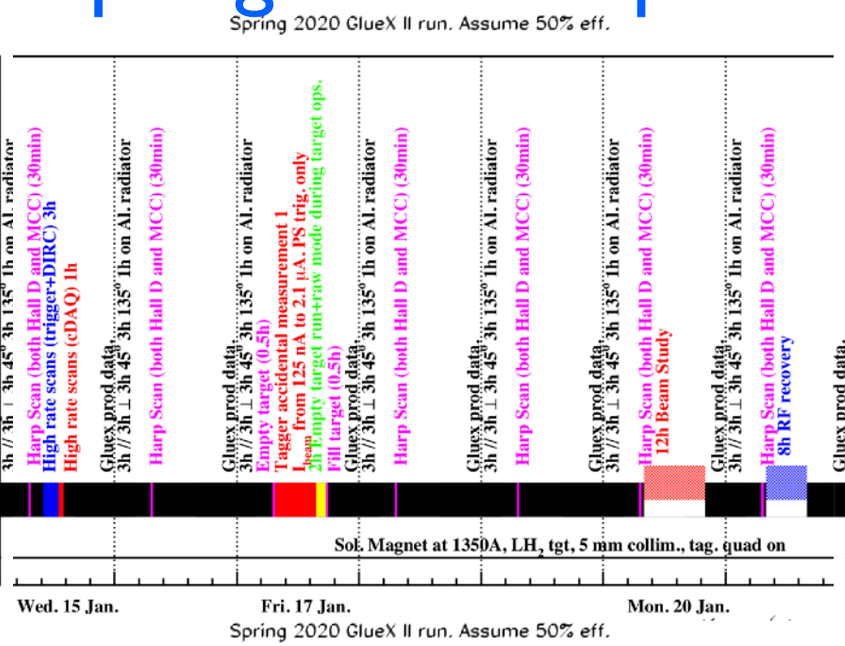
Spring 2020 runplan

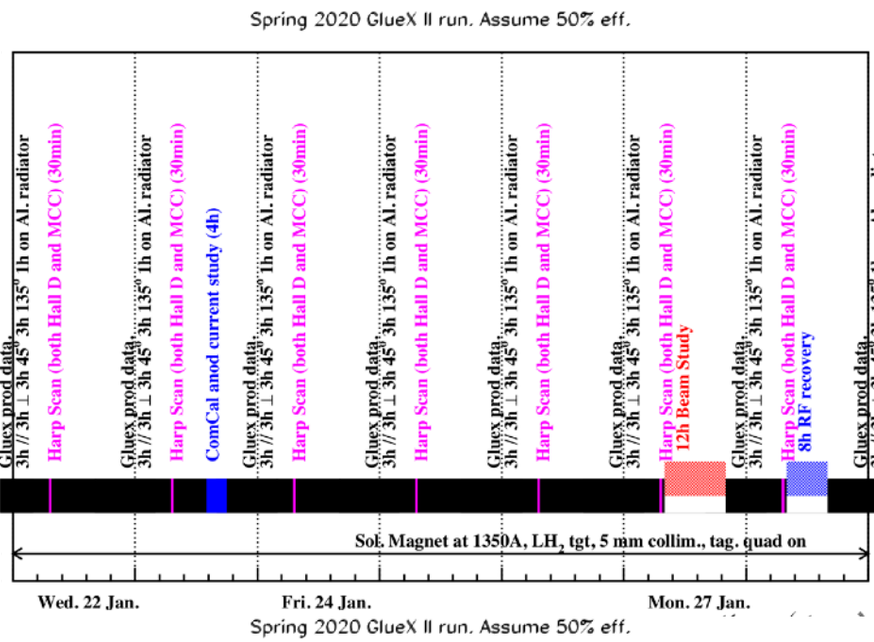
Production

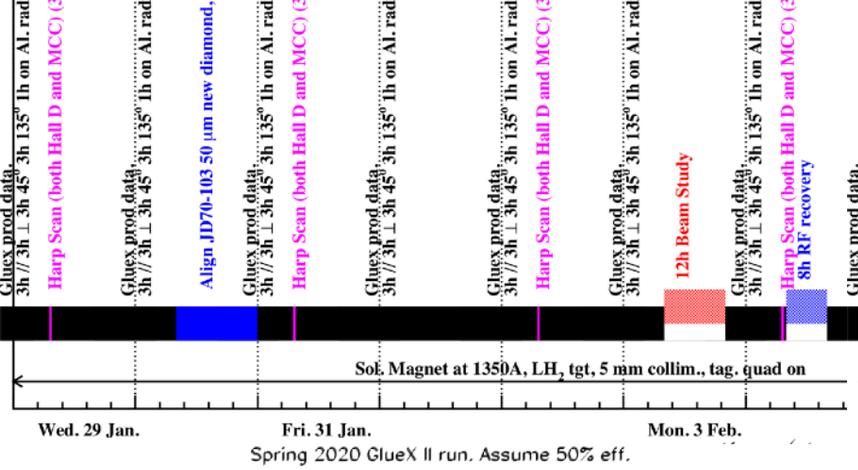
A. Deur. GlueX collaboration meeting. 02/13/2020

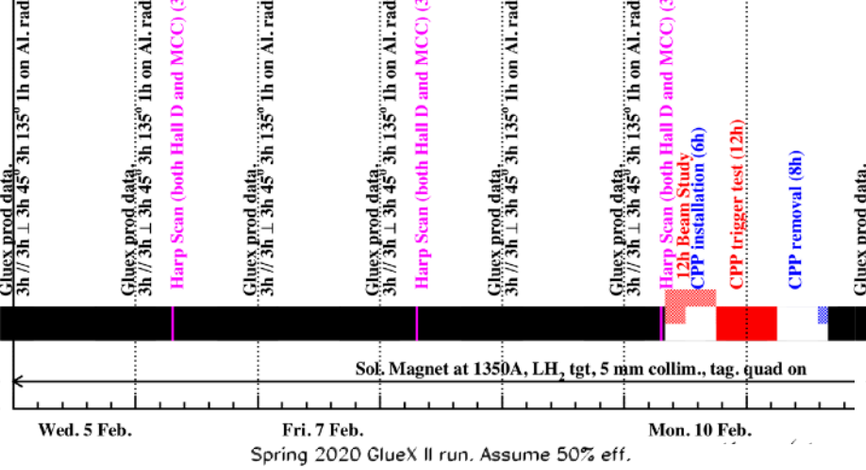
Spring 2020 runplan

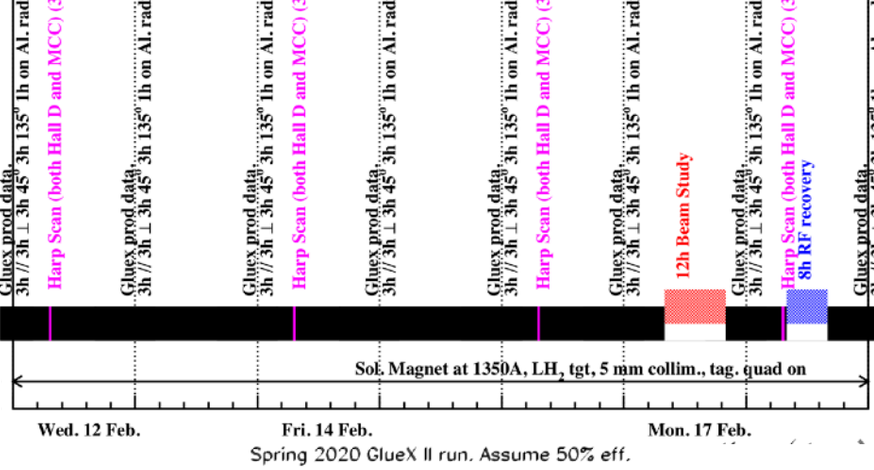


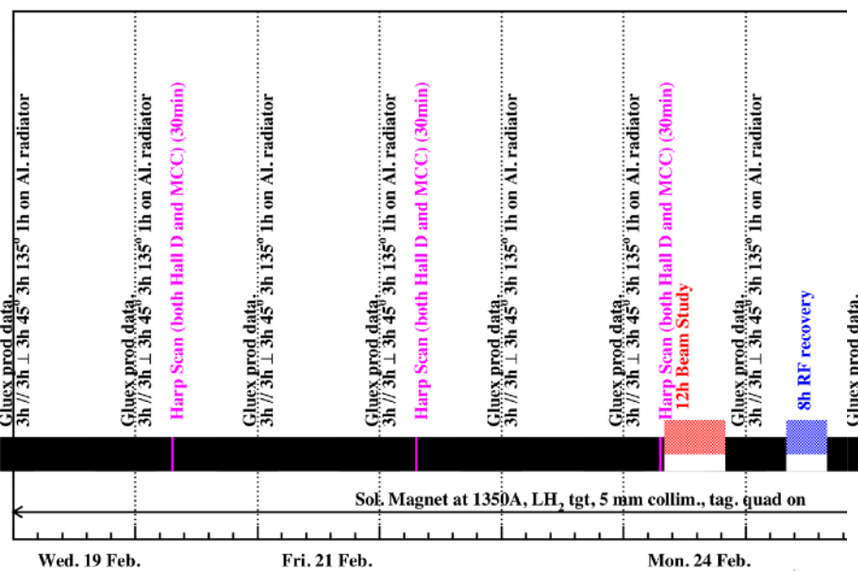


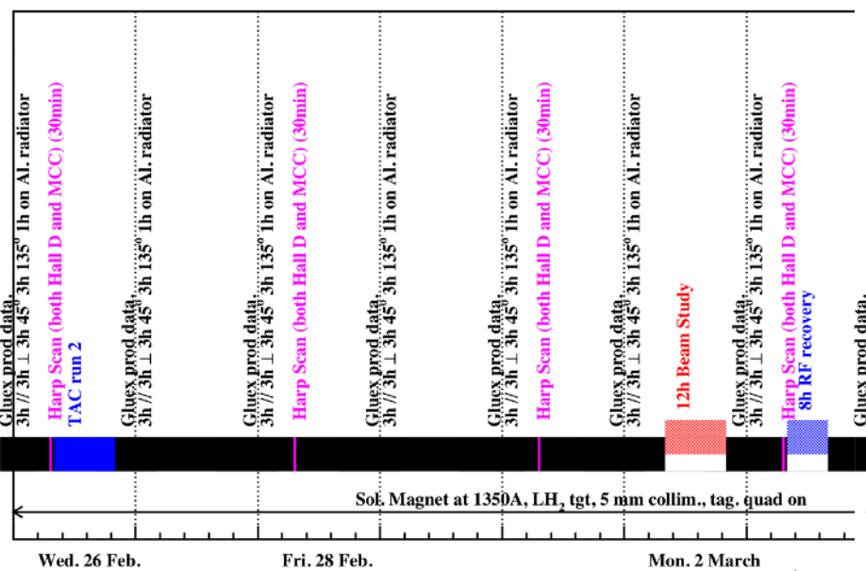


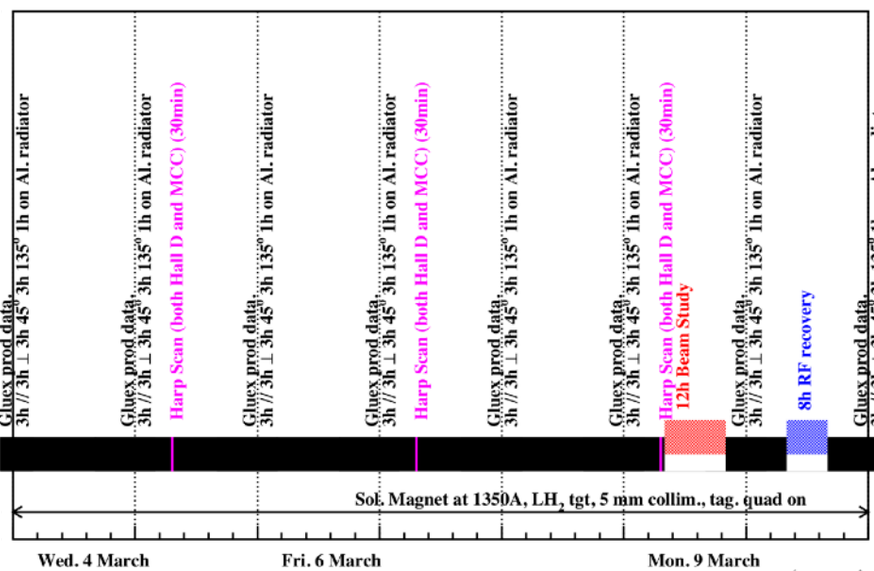




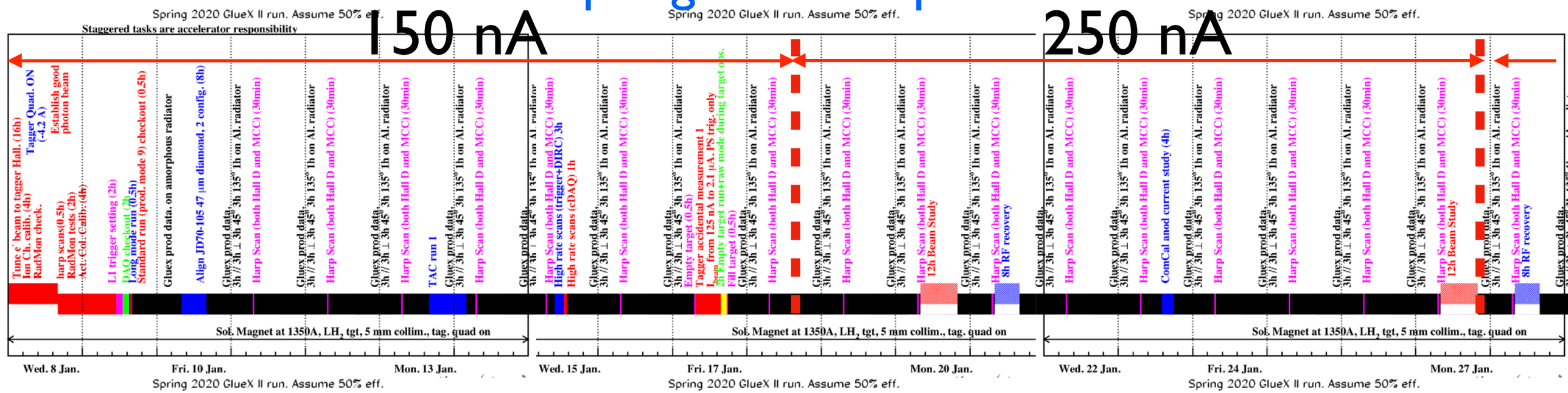


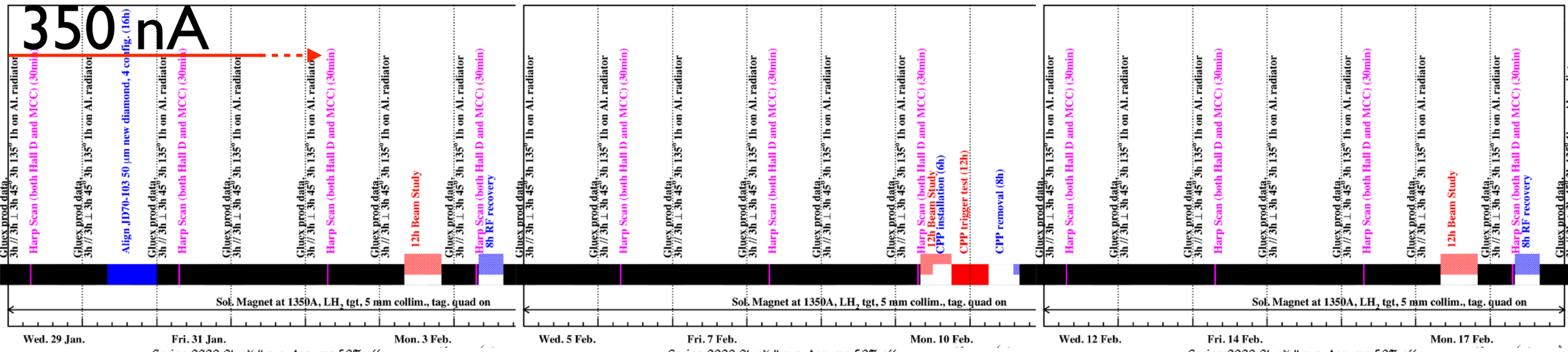


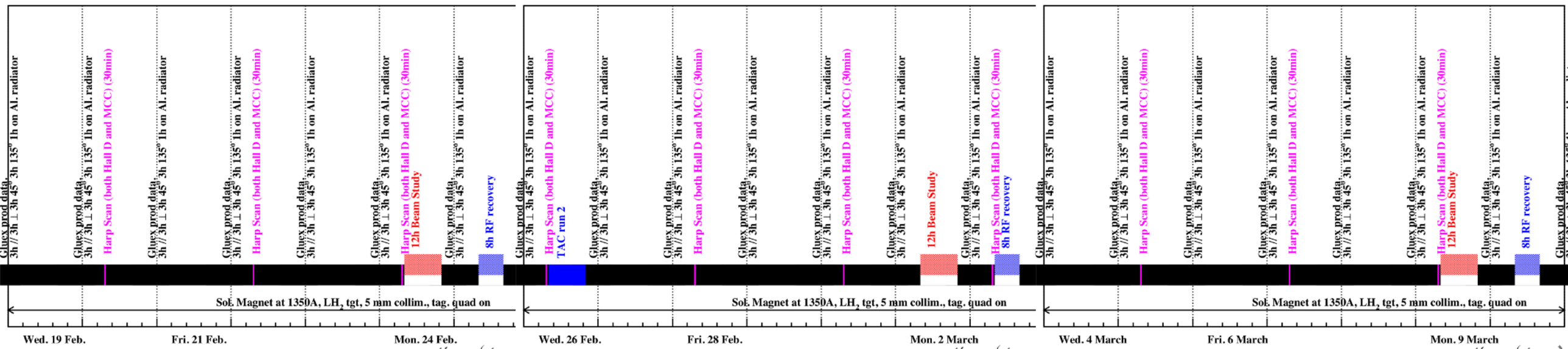




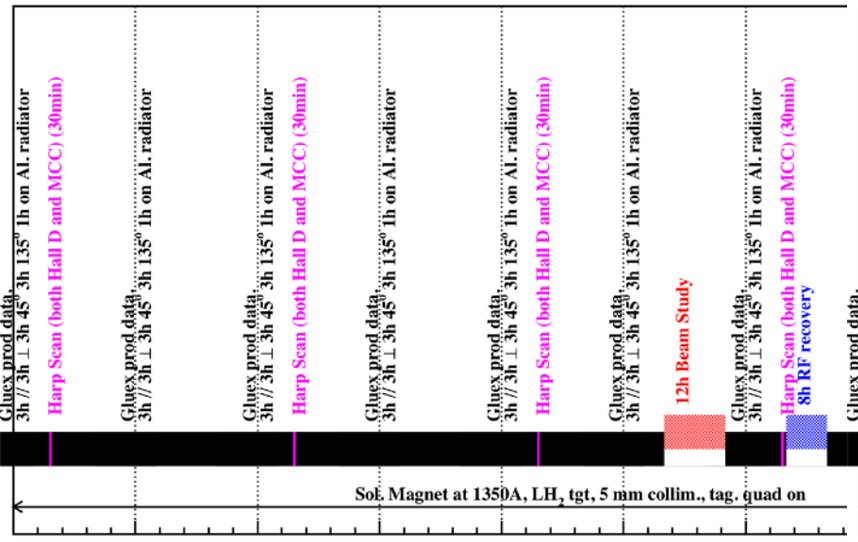
Spring 2020 runplan

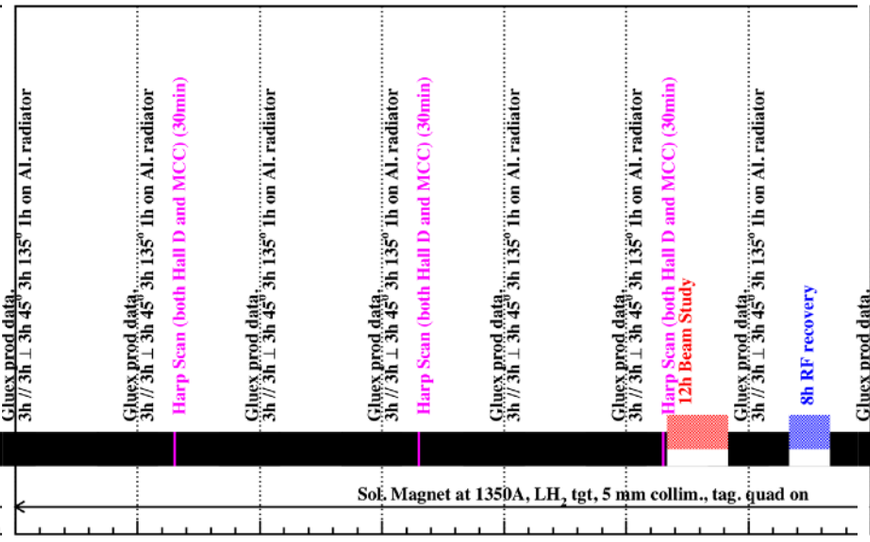


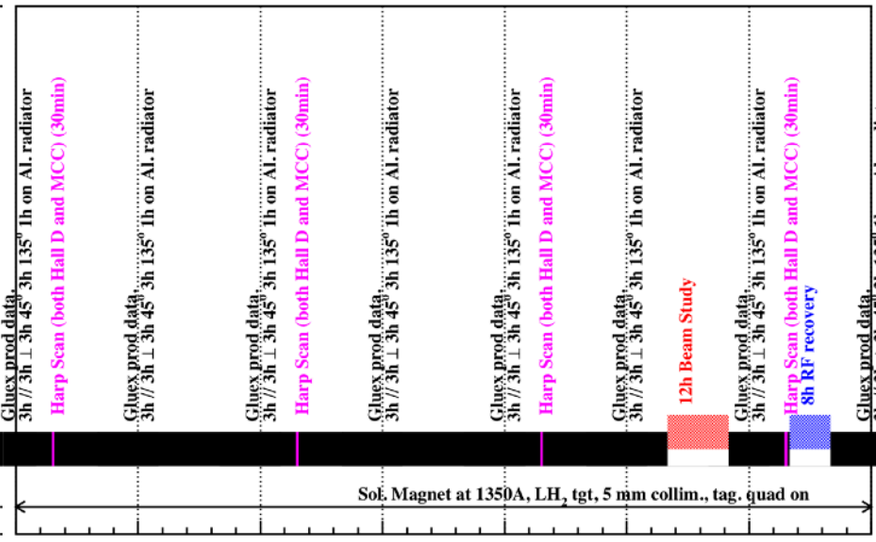




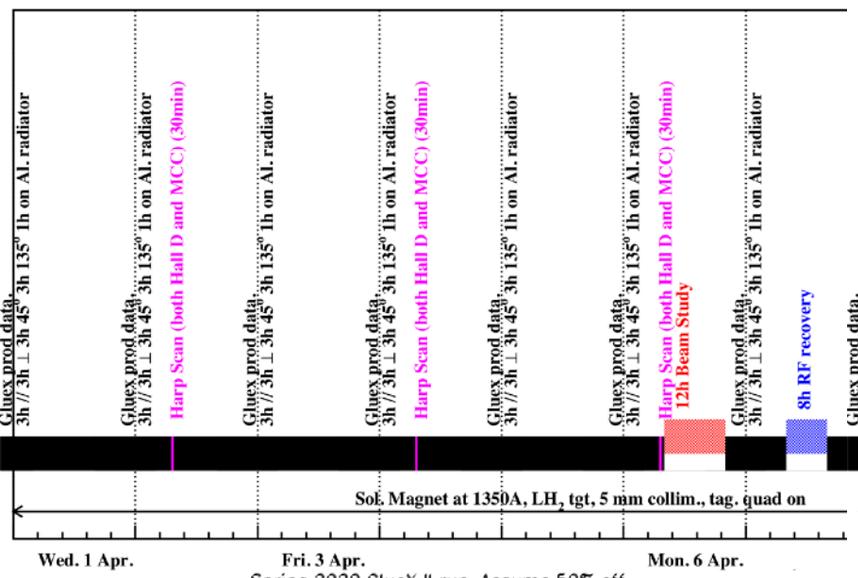
Spring 2020 runplan

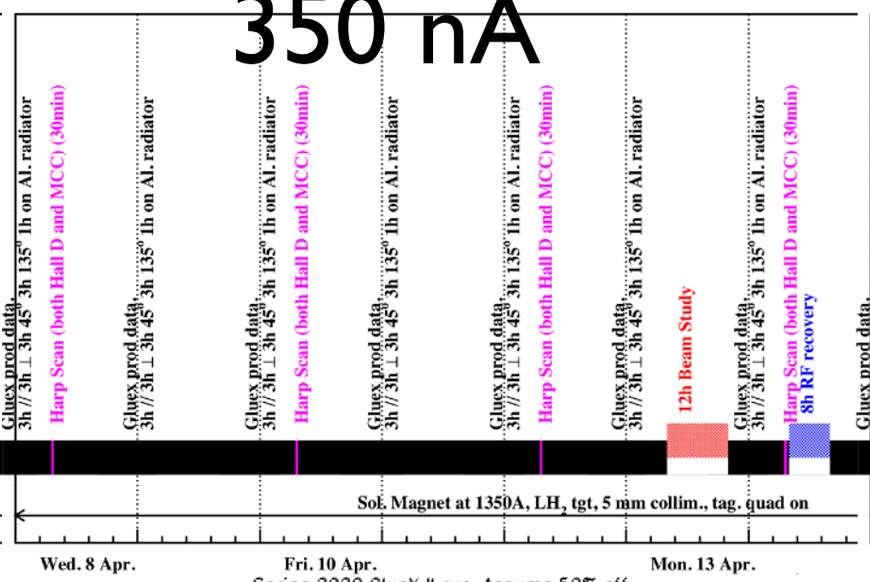


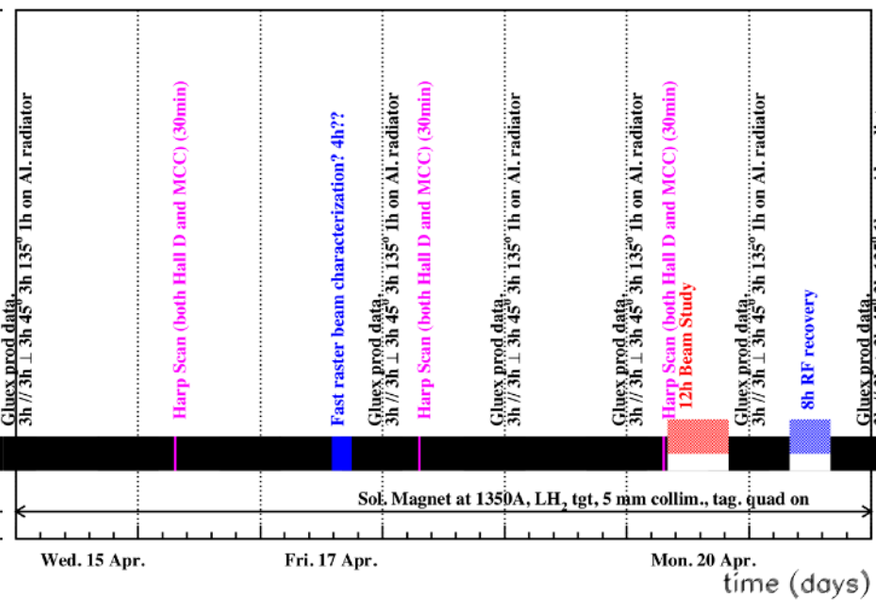


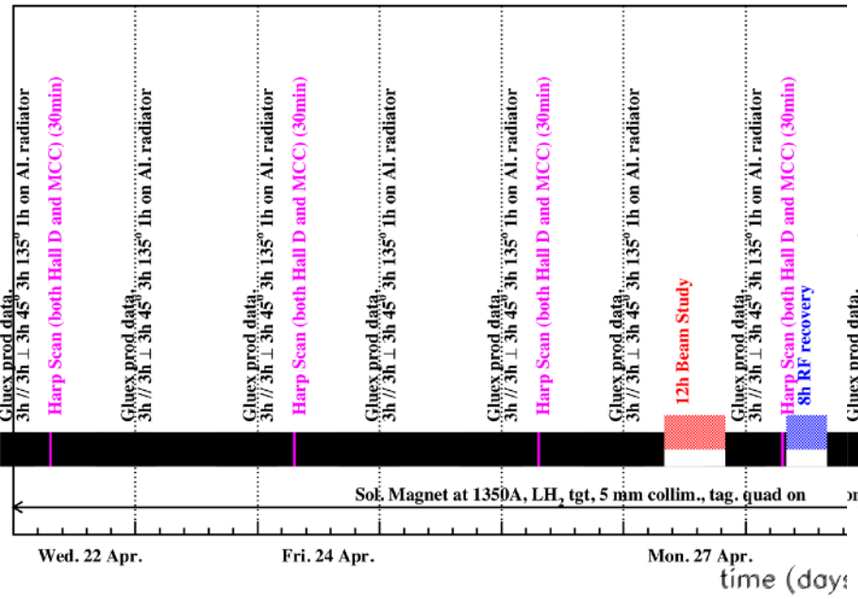


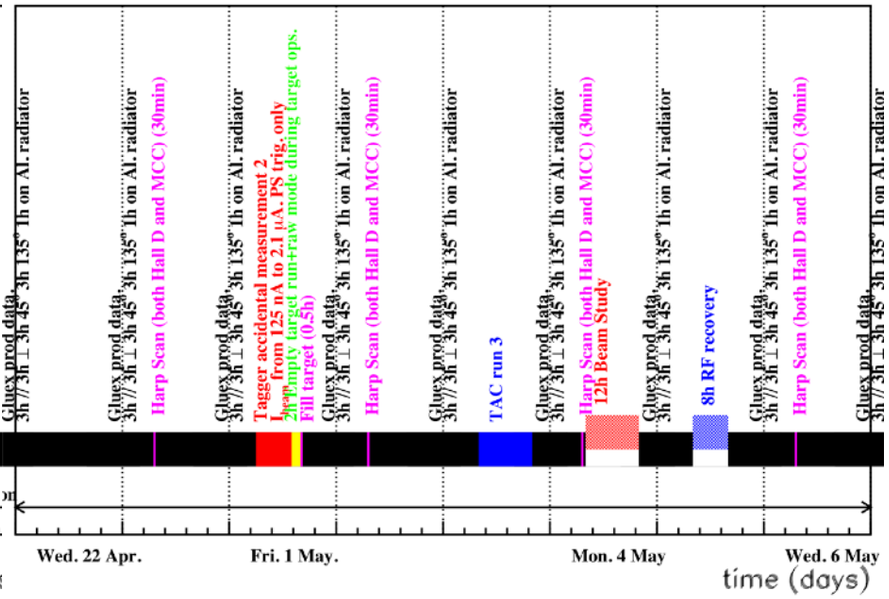
350 nA









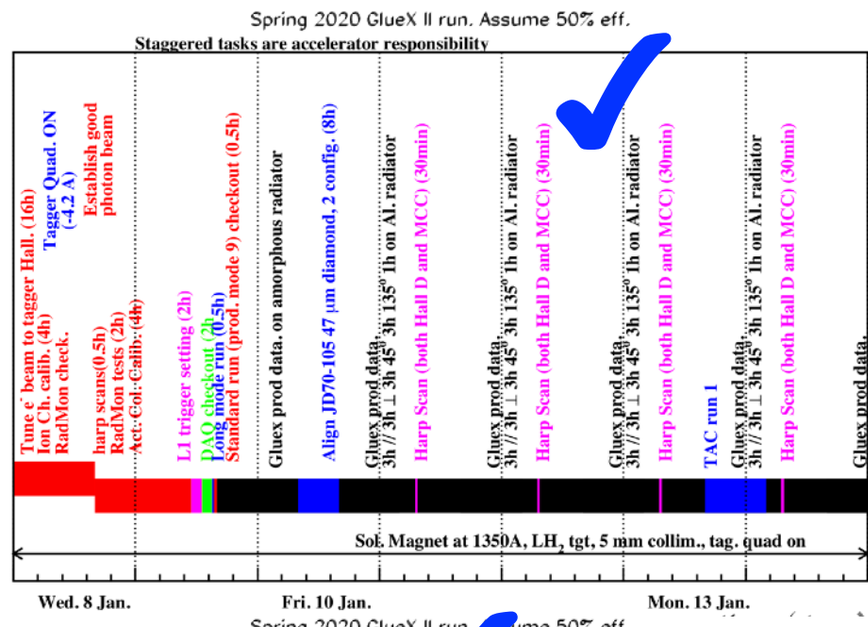


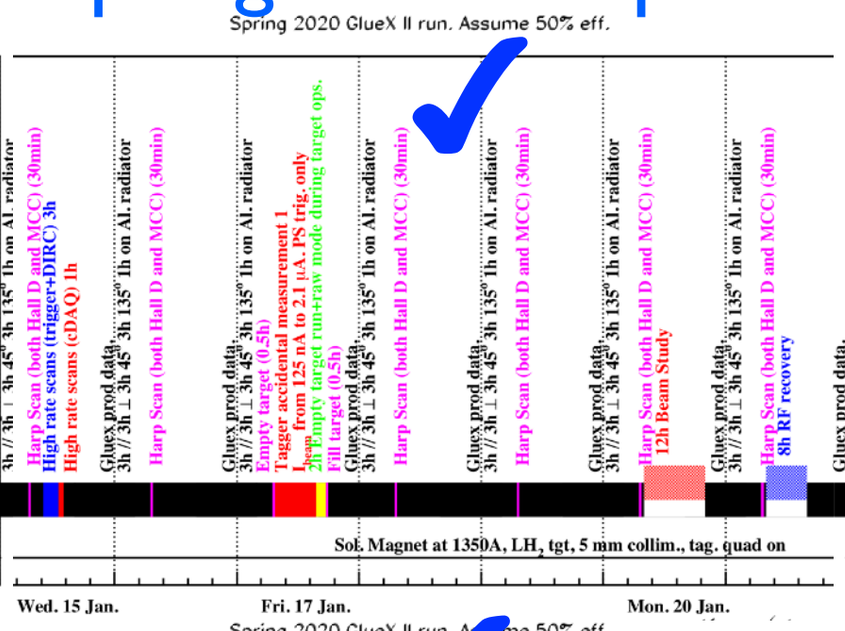
: GlueX-II production

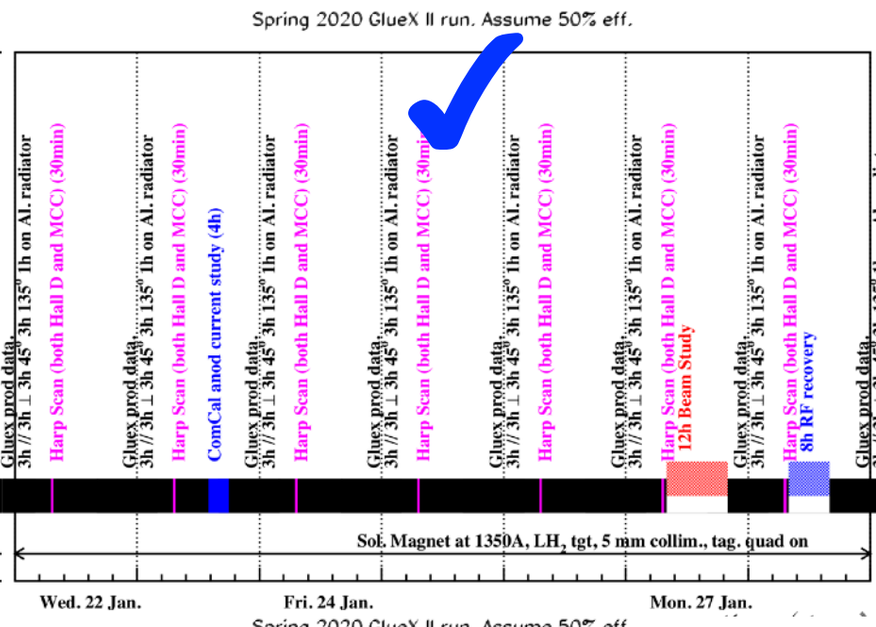
17 weeks total

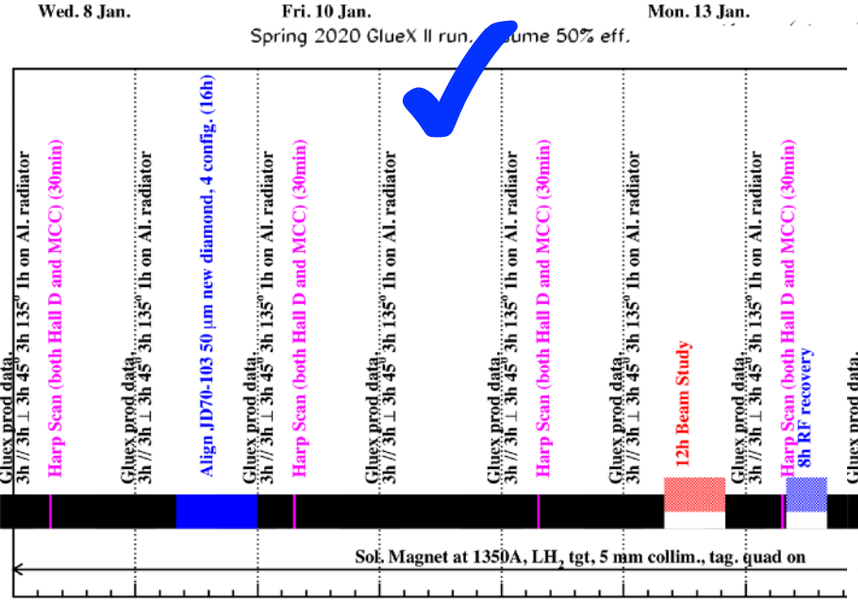
A. Deur. GlueX collaboration meeting. 02/13/2020

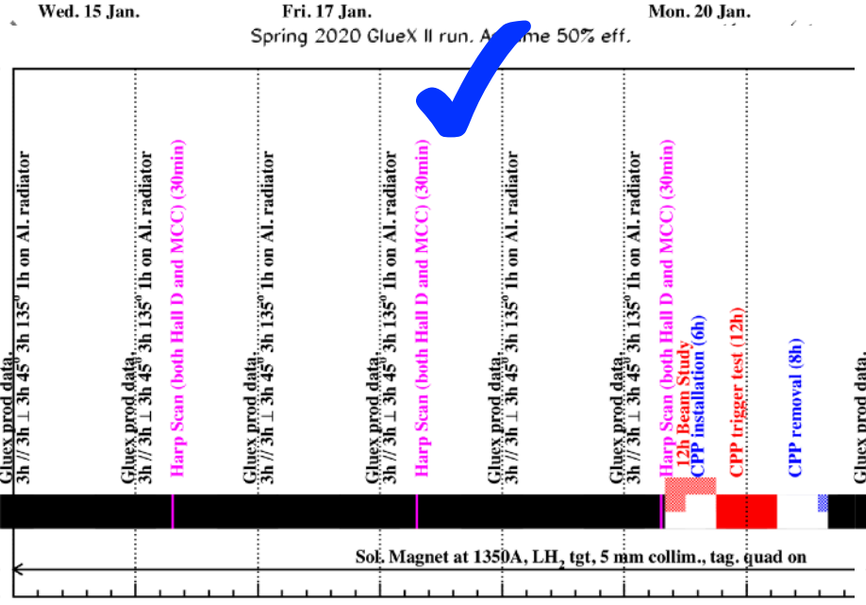
Spring 2020 runplan

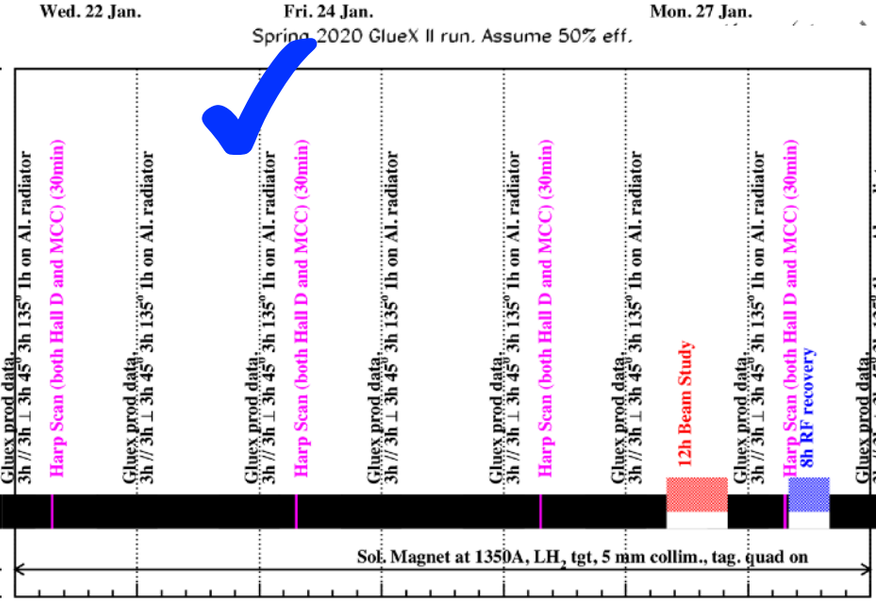


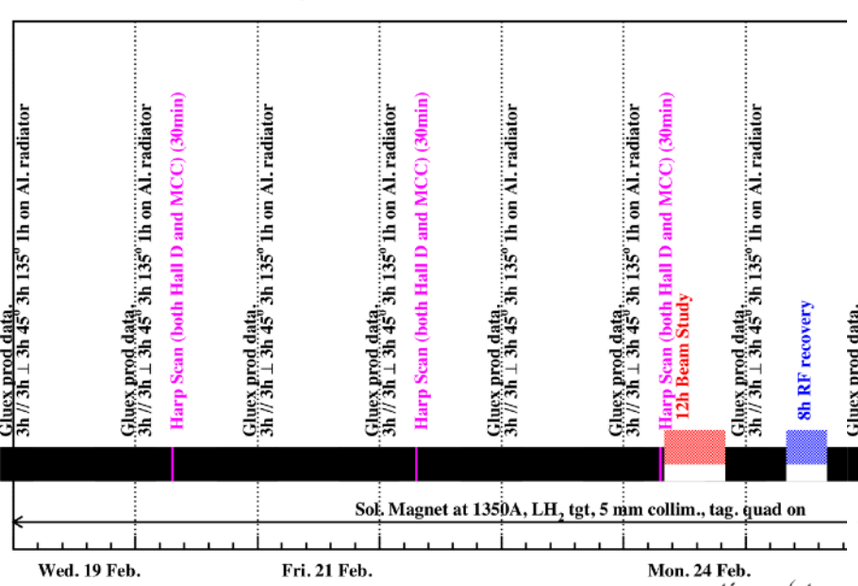


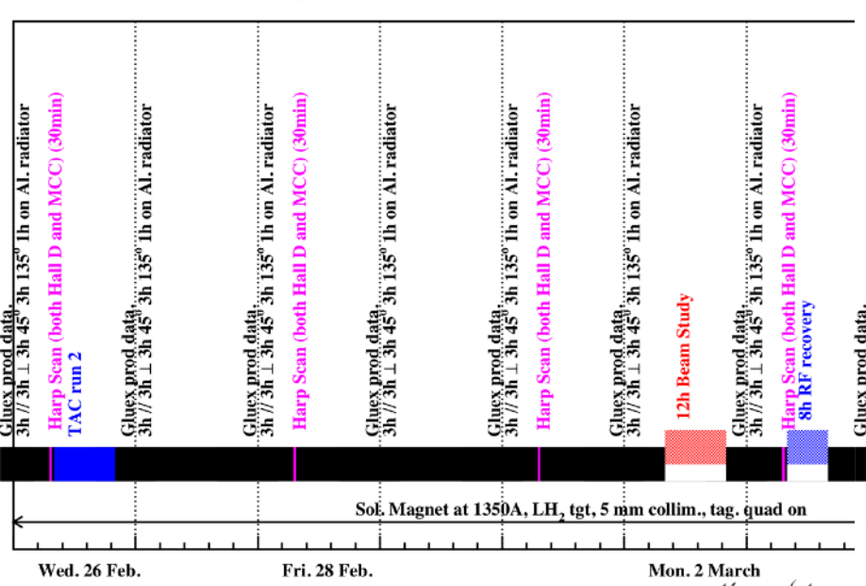


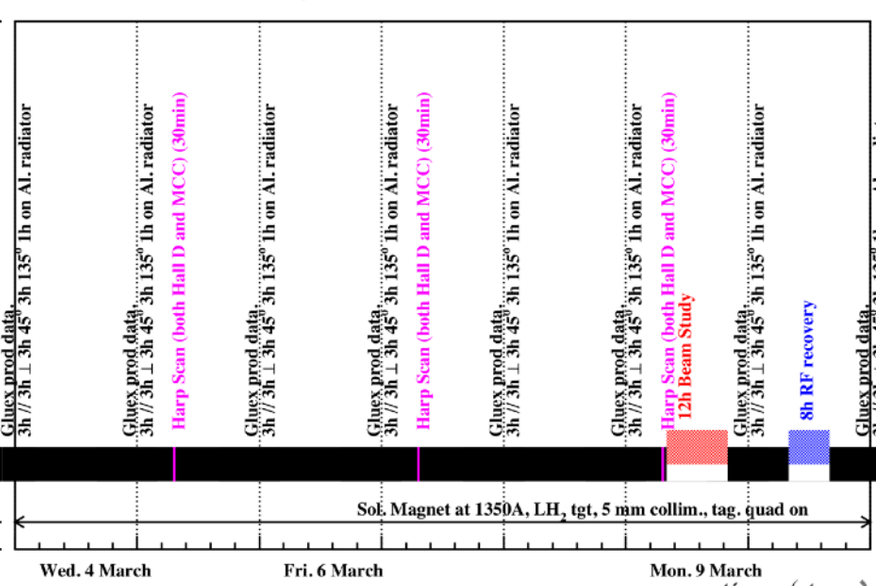












Spring 2020 runplan

Align 2 remaining JD70-105 config. ✓

TAC run 1. ✓

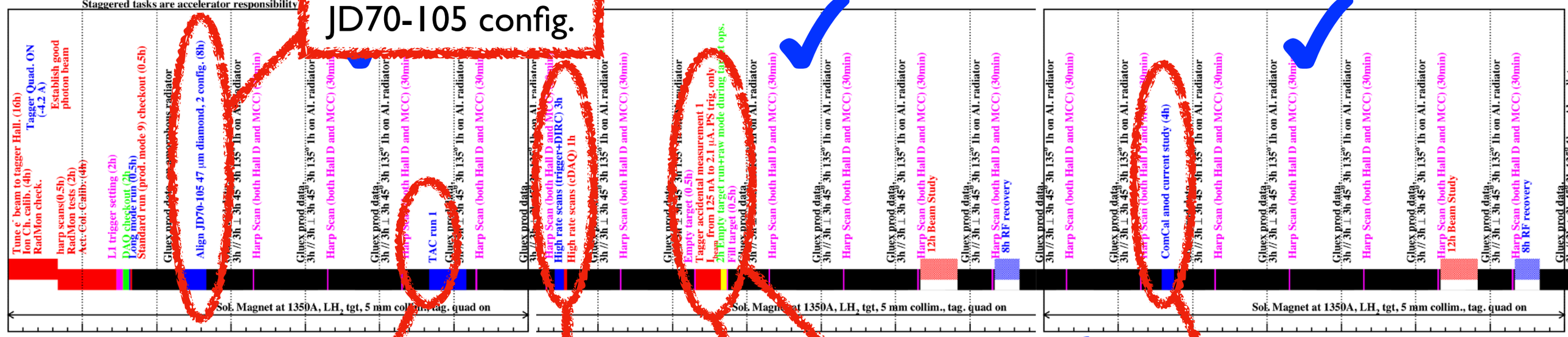
high rate test: 450 nA with 91% Lvt ✓

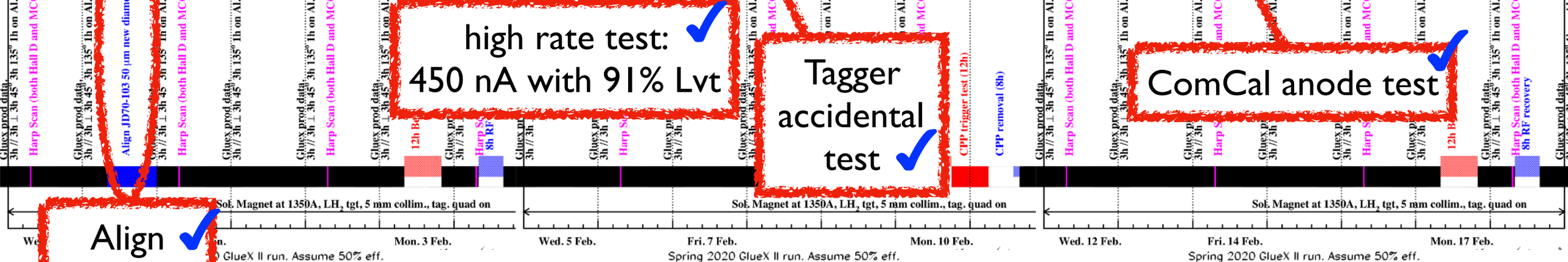
Empty target ✓

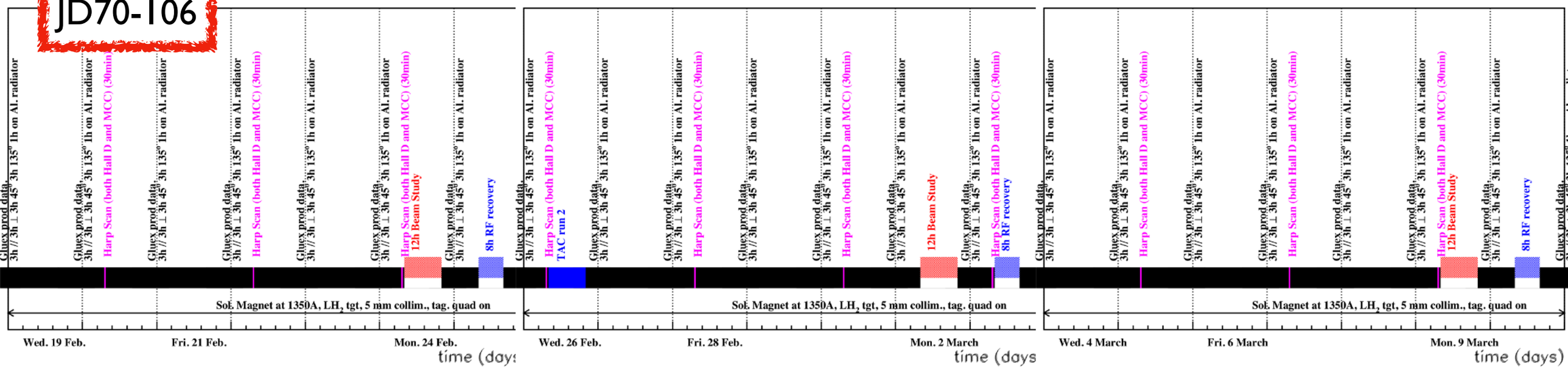
Tagger accidental test ✓

ComCal anode test ✓

Align JD70-106 ✓







Statistics for Spring 2020 run (as of Feb. 12th 2020, 7am)

Scheduled run time: 2676h (116 days): Jan 10th-May 6th
Acceptable beam used so far: 375h
Time elapsed so far: 751h

⇒ Running efficiency for Spring 2020 period so far: 50%

⇒ We are 28% along in the run period.

We have gathered so far 69B triggers, split in:

- 22% at 0° diamond orientation;
- 22% at 45° diamond orientation;
- 21% at 90° diamond orientation;
- 22% at 135° diamond orientation;
- 13% on Al. radiator.

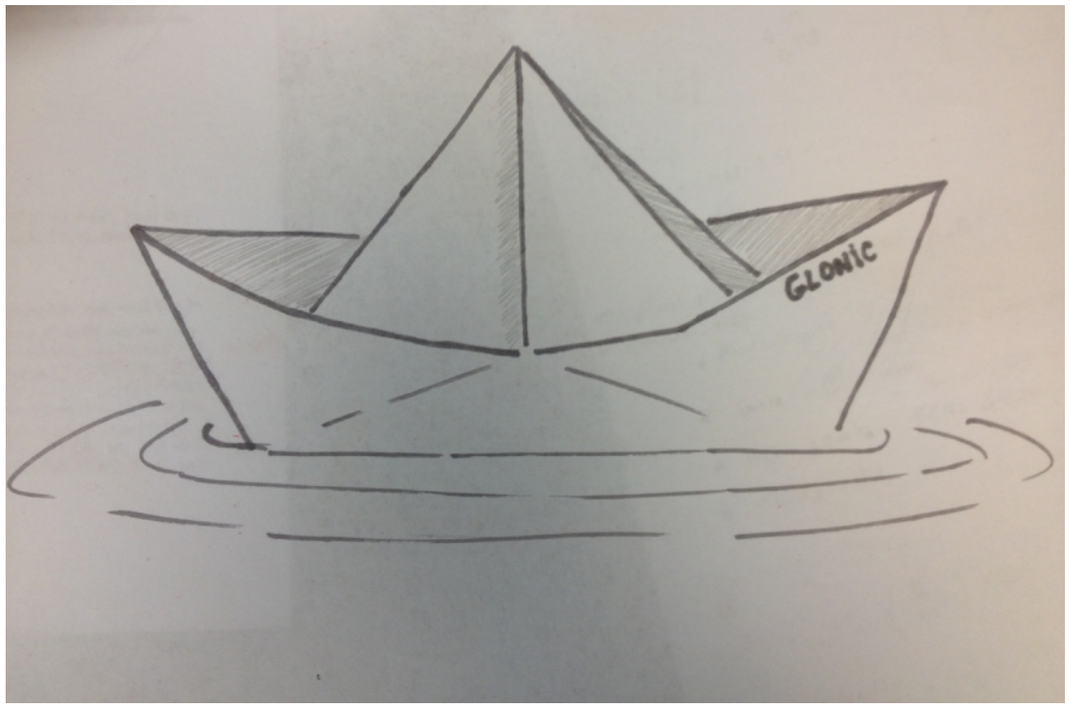
List of problems during Fall2019/Spring 2020 runs (not importance ordered)

- Solenoid trip 3 times (ground fault; compressor issue; power supply overheating. Also problems twice in ramping back-up due to power supply motherboard failures.)
- ~10 nA bleedthrough
  - Spray particles during radiator ops ⇒ dammaged electronics?
  - No TAC run unless one of the other halls is down
  - Cumbersome new procedure (dumplette insertion) for radiator ops
  - Bleedtrough beam characteristics different from main beam?

- Pair Spec power supply overheating (fixed before Spring run).
- Energy lowered by ~200 MeV due to unsustainable RF-tripsShort term beam energy drift of up to 10 MeV
- Latest firmware teething (including inducing data corruption).
- Frequent drops of PSS system.

0^{+-} ?
0^{--} ?

Comparison with other GlueX runs



Fall 2019
Actual Run time: 192h
Running efficiency: 32%
Production triggers: 0.

commissioning

Getting ready…

Spring 2019 +PrimEx
Actual Run time: 312h
Running efficiency: 36% (55%)
Production triggers: 0.

commissioning

Preparation

Fall 2018
Actual Run time: 788h
Running efficiency: 52%
Production triggers: 8×10^{10}

Spring 2018
Actual Run time: 1111.8h
Running efficiency: 55%
Production triggers: 1.5×10^{11}

Fall 2017
Actual Run time: 10.5h
Running efficiency: 3%
Production triggers: 0

Spring 2017
Actual Run time: 354.1h
Running efficiency: 56%
Production triggers:4.7×10^{10}

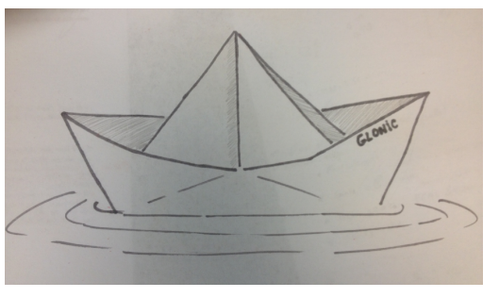
Fall 2016
Actual Run time: 84h
Running efficiency: 5.4%
Production triggers: 0

Spring 2016
Actual Run time: 458h
Running efficiency: 41%
Production triggers:6.9×10^{9}

Fall 2015
Actual Run time: 30.2h
Running efficiency: 20%
Production triggers: 0

Partly commissioning

Spring 2015
Actual Run time: 122h
Running efficiency: 20%
Prod. triggers: 0 (5.5 GeV run)



commissioning

Fall 2014
Actual Run time: 324h
Running efficiency: 34%
Production triggers: 0

Spring 2020 so far (Feb. 12th)
Actual Run time:751h (28% of tot. run time)
Running efficiency: 50%
Production triggers: 7×10^{10}

GlueX-II launched

Fall 2019
Actual Run time: 192h
Running efficiency: 32%
Production triggers: 0.
commissioning

Getting ready…

Spring 2019 +PrimEx
Actual Run time: 312h
Running efficiency: 36% (55%)
Production triggers: 0.
commissioning

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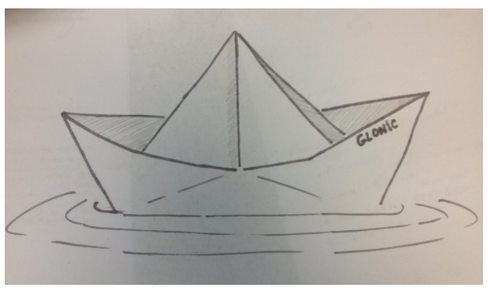

Fall 2014
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commissioning

Thank you