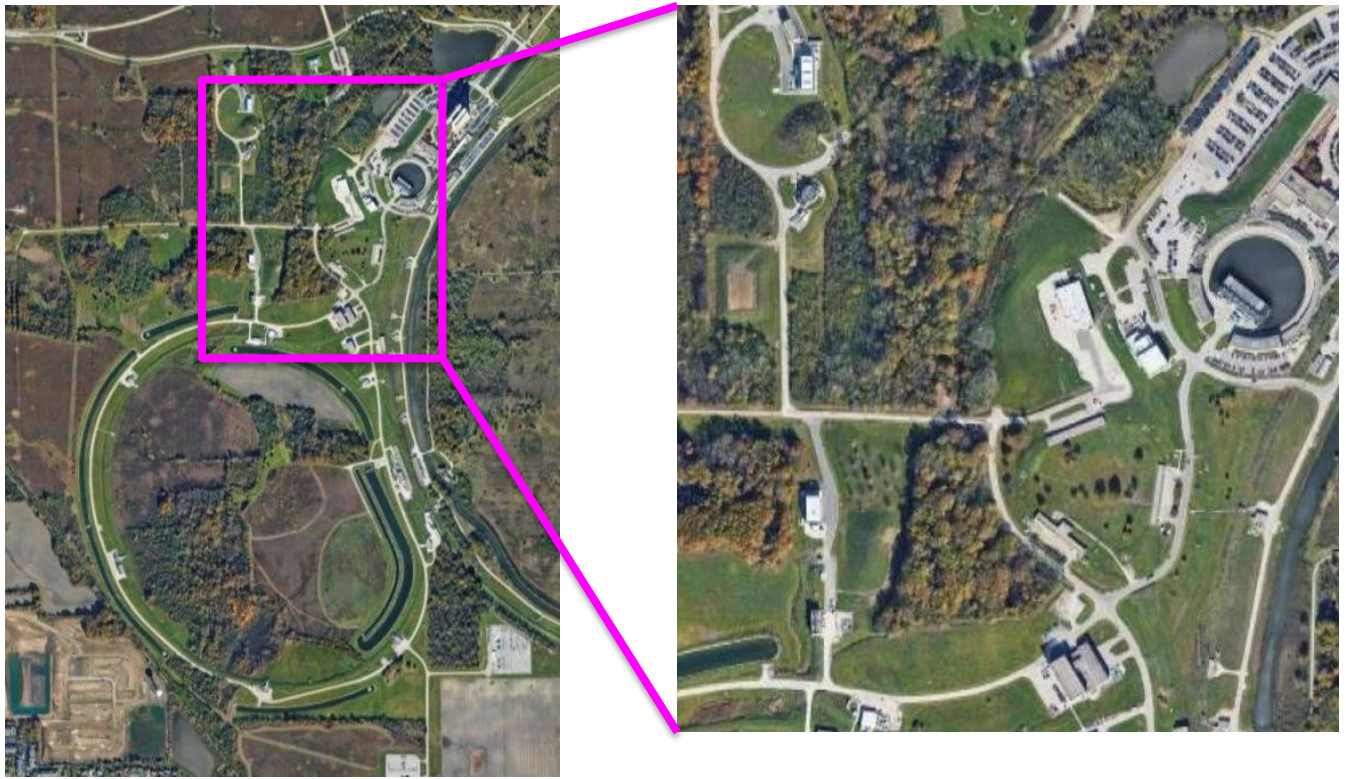
Beam Delivery to the SBN Program

T. Kobilarcik for M. Convery

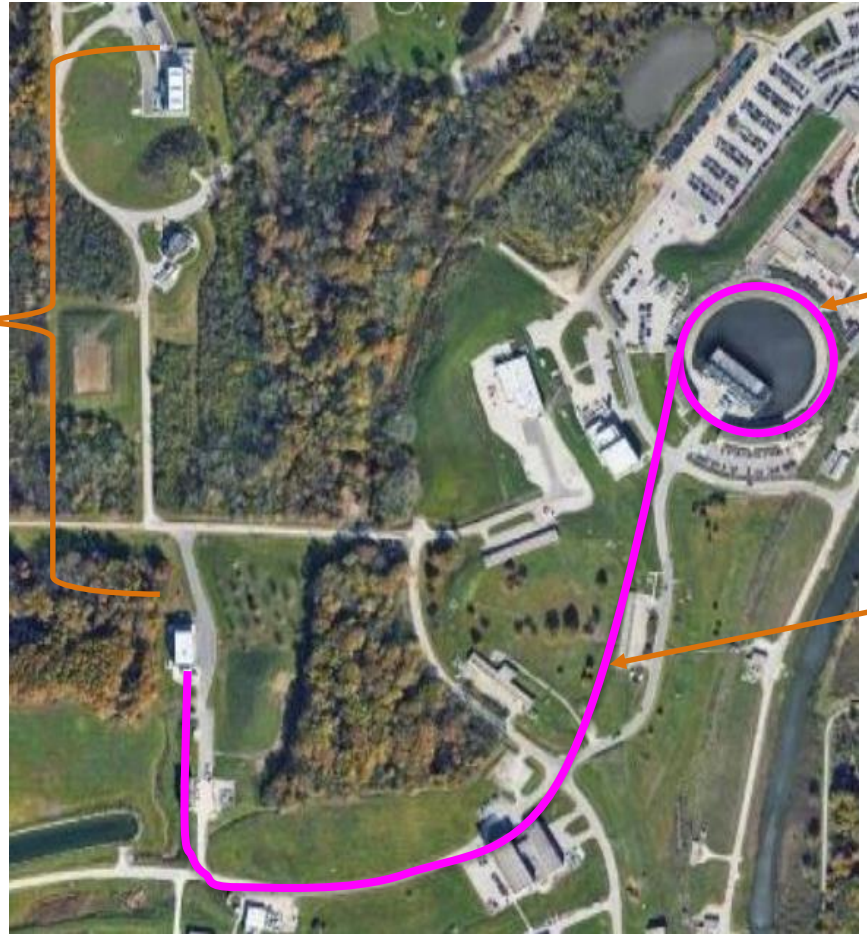
SBN Oversight Board Meeting

13 December 2019

Site Overview



Site Overview



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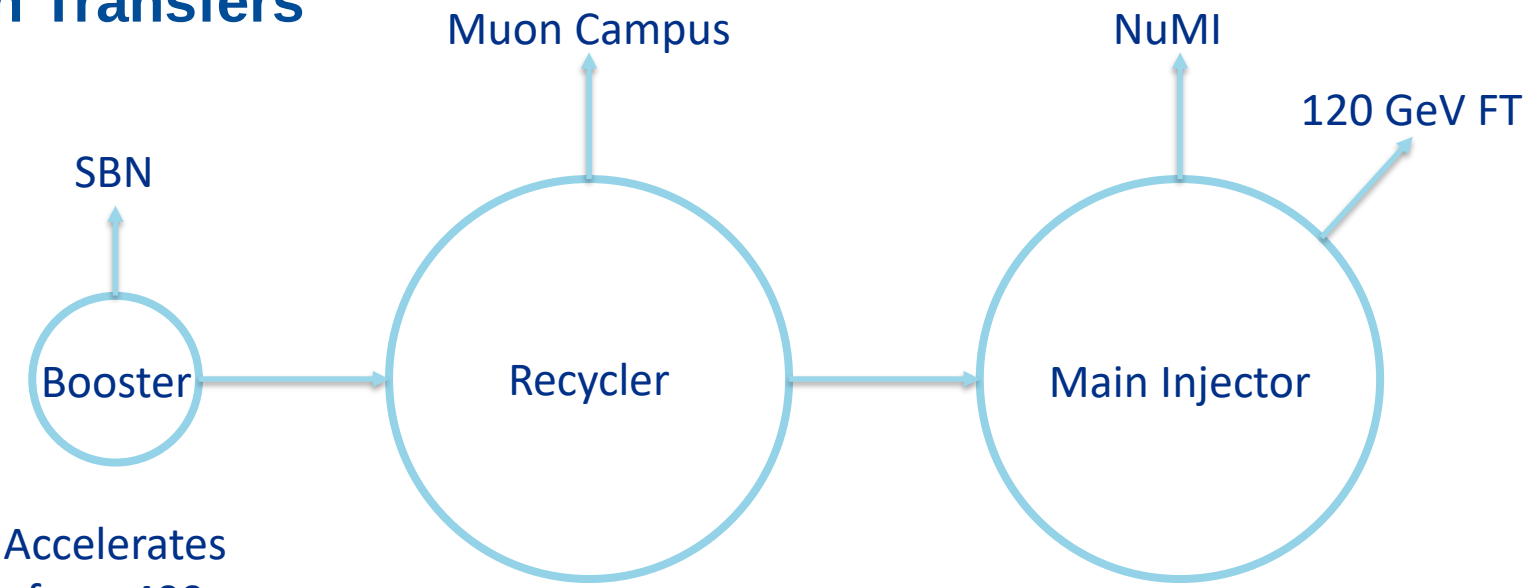
Proton Transfers



Accelerates from 400 MeV to 8 GeV
15 Hz rep rate

8 GeV storage ring
Used for RF manipulation, slip stacking and bunch rotation

Accelerates from 8 GeV to 120 GeV
Maximum 1.2 s rep rate

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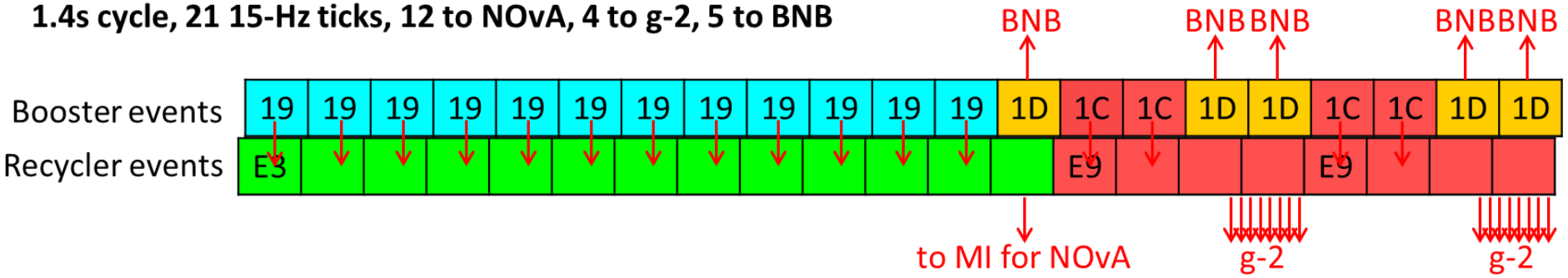
Beam to the Muon Campus affects BNB repetition rate

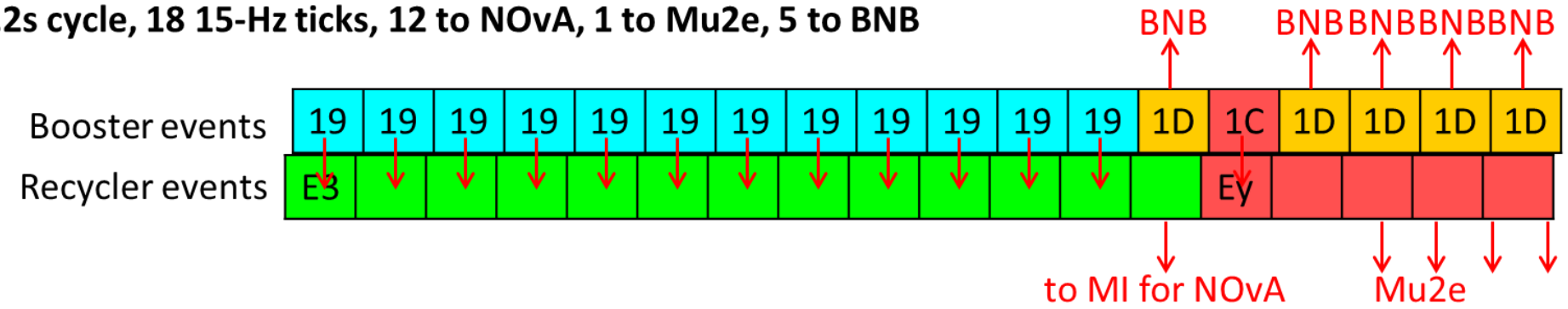
- 3.6 Hz during g-2 running (5 per 1.4s)



Beam to the Muon Campus affects BNB repetition rate

- 4.2 Hz during Mu2e 1-batch running (5 per 1.2s)
- Note Mu2e planned to take 2 batches per cycle but has limited experiment shielding prior to the long 2025-27 shutdown to save money

1.2s cycle, 18 15-Hz ticks, 12 to NOvA, 1 to Mu2e, 5 to BNB



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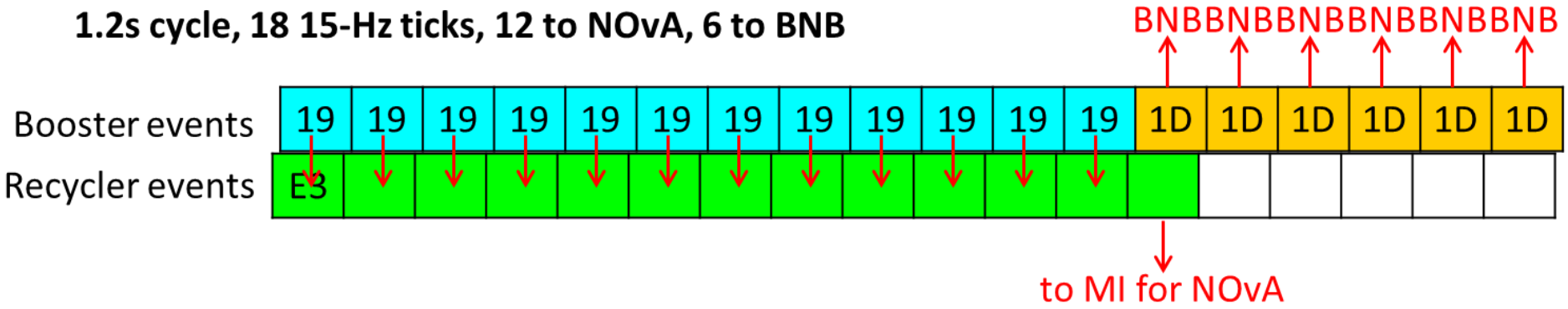
Beam to the Muon Campus affects BNB repetition rate

- 5 Hz when Muon Campus not running (e.g. this week, also g-2 has regular 4h trolley runs)



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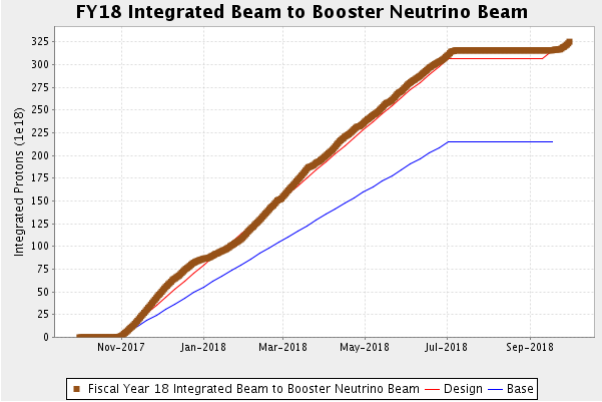
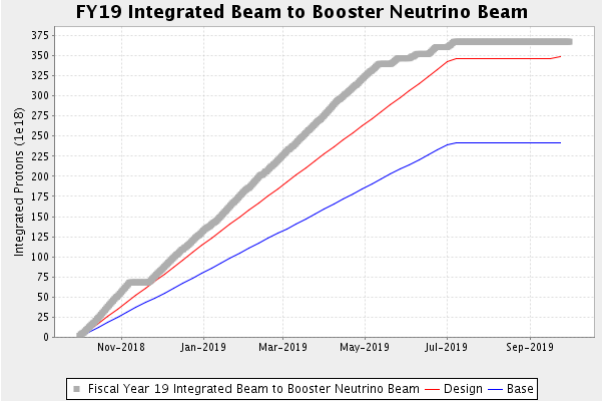
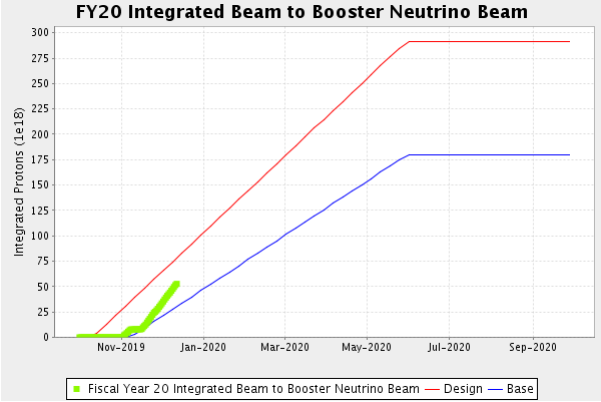
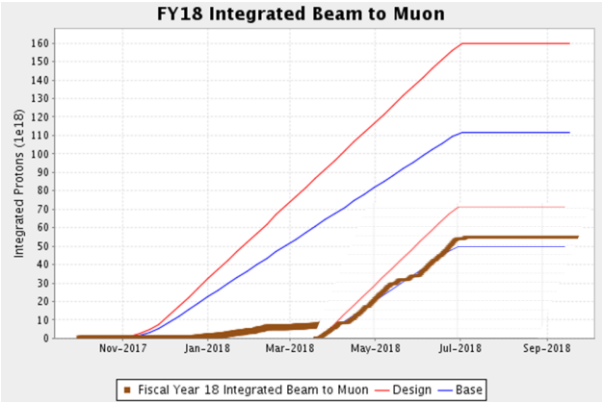
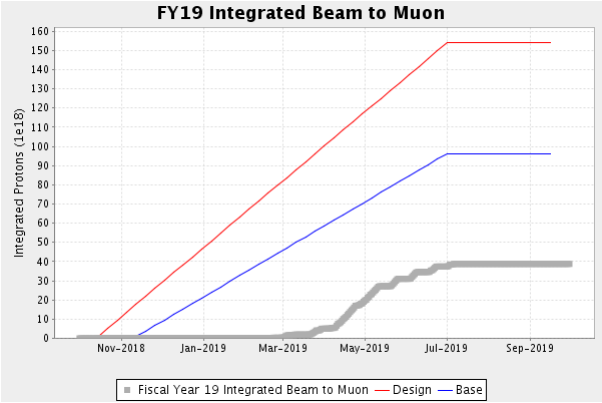
In recent years, BNB has benefitted from g-2 downtime

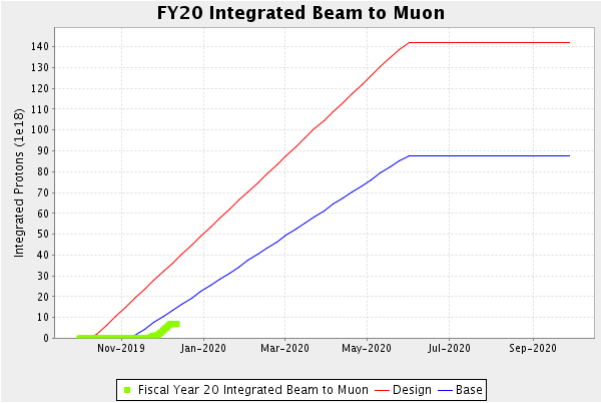












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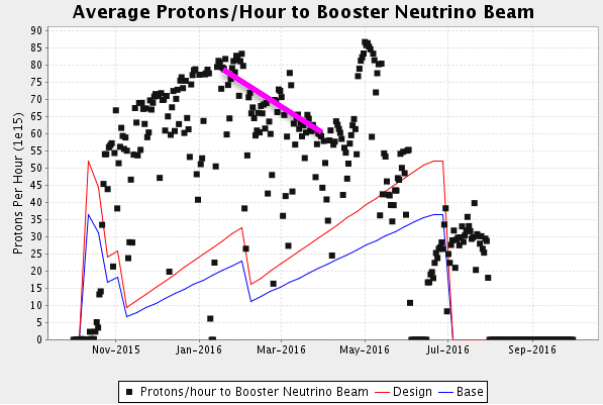
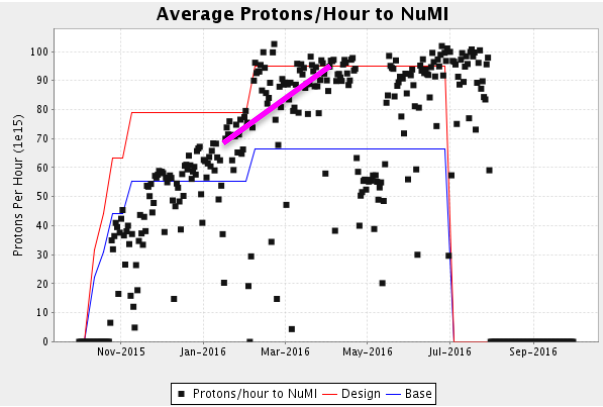
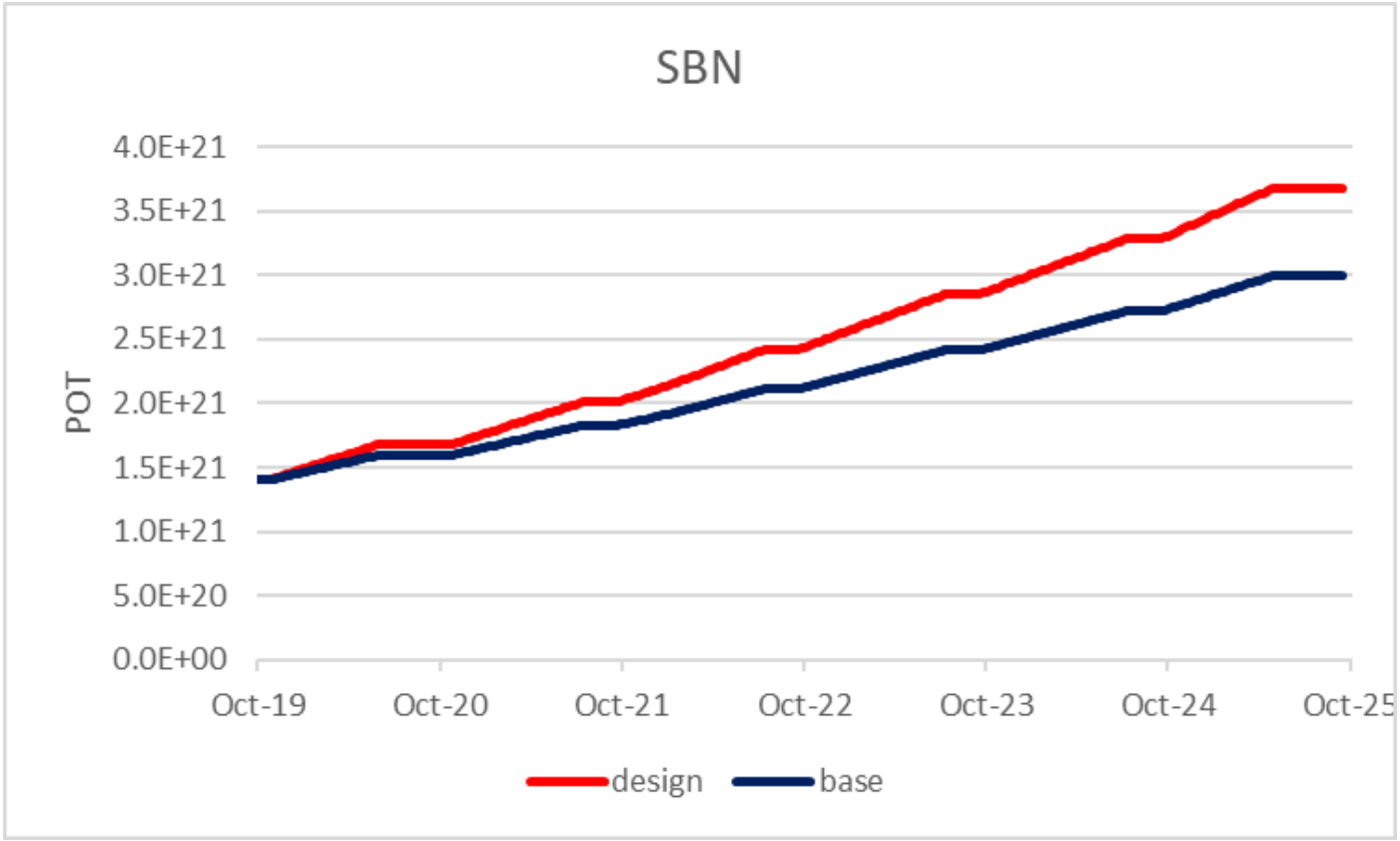
Effect of NuMI on BNB beam

- NuMI is given priority on intensity per pulse when Booster losses are high
- This should be a small effect except when we work on increasing from 700 to 900kW to NuMI (FY22-23)
- Plots show FY16 ramp up from 400kW towards 700kW – multiple things were going on, but can see trend during ramp up once we hit the Booster loss limit





Projections for beam to BNB



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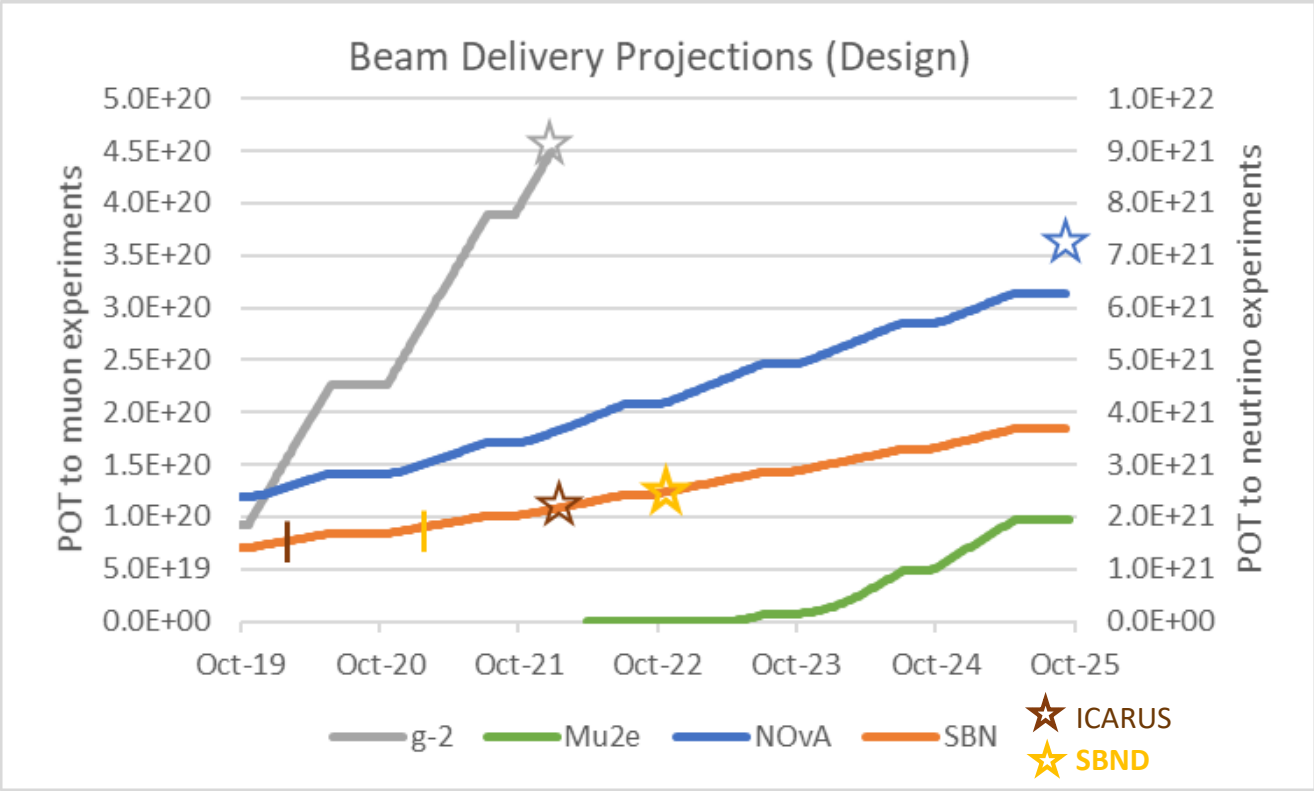
Projections assuming running at design levels for all expts



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