



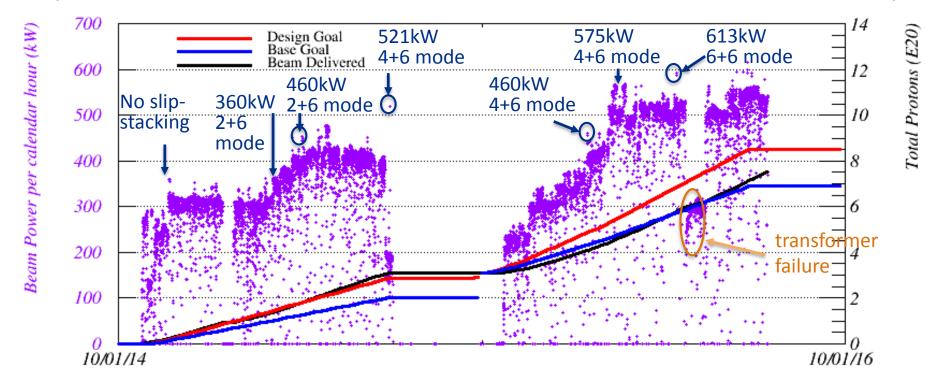


Beam to NuMI

Mary Convery MINERVA ORR 17 October 2016

Ramping up Beam Power to 700 kW to NuMI

(Note that SY120 takes 10% of timeline, 700 kW → 630 kW)



- Increased number of batches slip-stacked in Recycler in steps
- At each step, increased intensity while tuning for efficiency, losses
- Successfully demonstrated 700 kW for one cycle
- Regular 700 kW operation after this shutdown

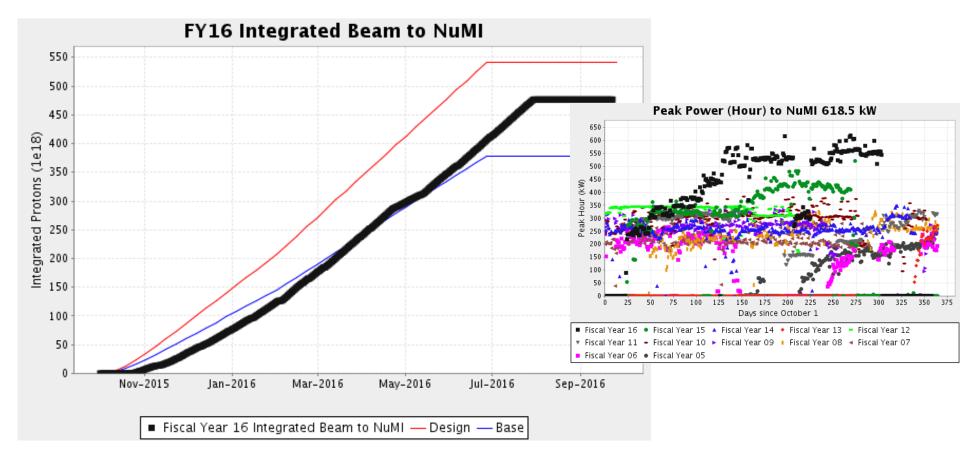


700 kW Beam to NuMI

	2ptions	5							Help
2,6 current supercycle 60.0									
AAA	AAA	AAA	AAA	AAAAA	A A A A A A	A A A A A	A A A A A A	A A A A A A	
Tmp	86.1	F (3	30.0 C)	6/13/16	16:10:57	Source	55.3 m <i>A</i>	SRC Stat	AA
NuMI		48	.6 E12	SY Tot	0.0 ррр	Linac	25.5 m <i>A</i>		
NuMI	Pwr	70	1.0 kW	MTest	4.8Е7 ррр	Booster	4.1 E12	Rate	10.15 Hz
BNB		0	.0 p/hr	MCenter	0.0 ррр	Recycler	52 E12		
BNB	1D Rat	te	0.4 Hz	: NM	0.0 ррр	WI	48.7E12		
13 Jun 2016 08:49:54									
Beam to NUMI(6+6), SeaQuest, MTest & MCenter									
BZ S	horn g	rour	nd faul	t investigat	ion.				



Achieved FY16 Goals for Beam to NuMI



- Based on milestones for achieving 700 kW beam power
- Ran consistently at 550 kW (w/ SY120) prior to shutdown, make last ~10% push once collimators installed



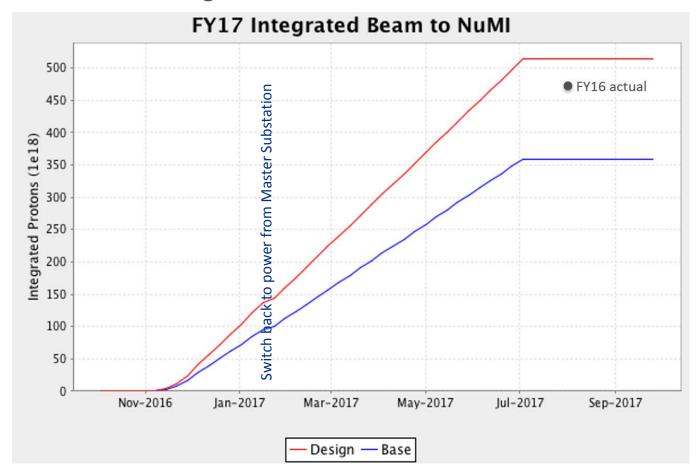
Collimators Installed during Shutdown





FY17 Projected Beam to NuMI

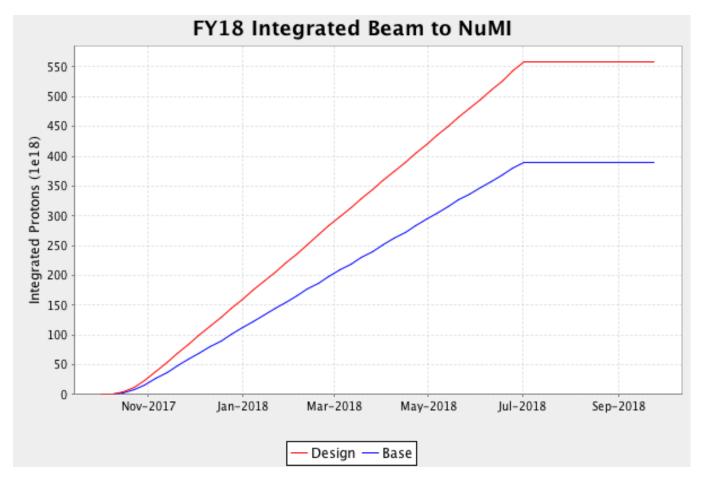
Expect similar integrated beam to NuMI as FY16





FY18 Projected Beam to NuMI

 Longer run time (start up sooner) but 95% rate due to g-2 (cycle time goes from 1.33s to 1.4 s)





Beyond 700 kW

- In the longer term, beam power could be increased by
 - Increasing Booster batch intensity (increases losses)
 - Shortening MI ramp for ~1.2s cycle and going from 15 Hz to 20 Hz (requires new RF systems)
- We are looking into options for PIP-I+

