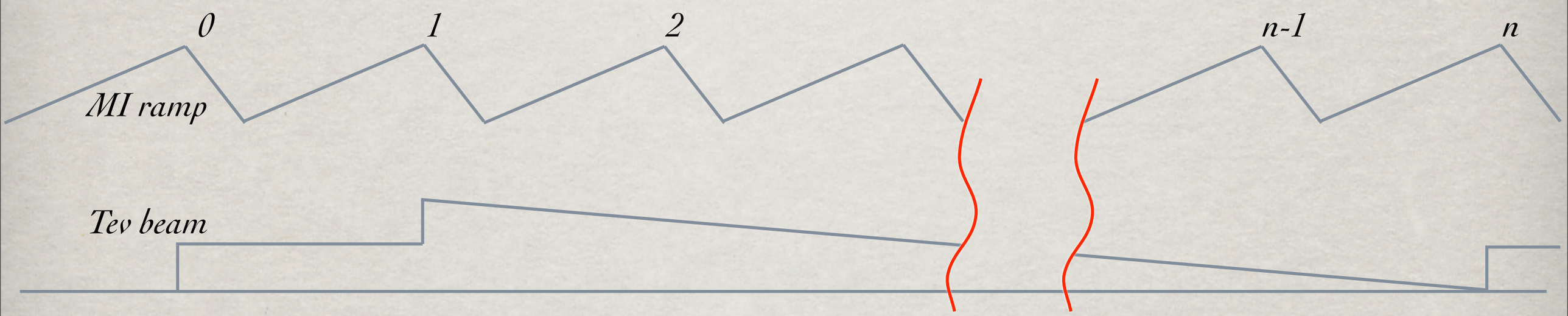
Tev120 Stretcher Ring

Mike Syphers

NOvA Era

- Assume 1.333 s cycle time for Main Injector
  - = 20/15 s, or 20 Booster pulses
  - uses Recycler as stretcher prior to injection
  - slip stacking --> 12 pulse max. into REC
- Assume Booster delivers 4e12 (4 Tp) per cycle
- Use SY120 more or less “as is” for Fixed Target program

Using the Tevatron



- Tev circumference = 2x MI
  - take two MI cycles to fill
- use 2 cycles out of *n*, *n*>1, for use in Tev120, the other *n*-2 used for NOvA
- slow spill during the available *n*-1 MI cycles

800 GeV FT Intensity

Max Tevatron intensity = 30 Tp = 3e13 at 120 GeV

n	T[s]	df[%]	hit[%]	Pave[kW]	Pmax[kW]	NdotAve[Tp/s]	NdotMax[Tp/s]
2	2.667	50	100	216	432	11.2	22.5
3	4.000	67	67	144	216	7.5	11.2
4	5.333	75	50	108	144	5.6	7.5
5	6.667	80	40	86	108	4.5	5.6
10	13.333	90	20	43	48	2.2	2.5
20	26.667	95	10	22	23	1.1	1.2
50	66.667	98	4	9	9	0.5	0.5
100	133.333	99	2	4	4	0.2	0.2
200	266.667	100	1	2	2	0.1	0.1

6 Batch Operation

Max Tevatron intensity = 48 Tp = 4.8e13 at 120 GeV

n	T[s]	df[%]	hit[%]	Pave[kW]	Pmax[kW]	NdotAve[Tp/s]	NdotMax[Tp/s]
2	2.667	50	100	346	691	18.0	36.0
3	4.000	67	67	230	346	12.0	18.0
4	5.333	75	50	173	230	9.0	12.0
5	6.667	80	40	138	173	7.2	9.0
10	13.333	90	20	69	77	3.6	4.0
20	26.667	95	10	35	36	1.8	1.9
50	66.667	98	4	14	14	0.7	0.7
100	133.333	99	2	7	7	0.4	0.4
200	266.667	100	1	3	3	0.2	0.2

12 Batch Operation
(slip stacking)

Max Tevatron intensity = 96 Tp = 9.6e13 at 120 GeV

n	T[s]	df[%]	hit[%]	Pave[kW]	Pmax[kW]	NdotAve[Tp/s]	NdotMax[Tp/s]
2	2.667	50	100	691	1382	36.0	72.0
3	4.000	67	67	461	691	24.0	36.0
4	5.333	75	50	346	461	18.0	24.0
5	6.667	80	40	276	346	14.4	18.0
10	13.333	90	20	138	154	7.2	8.0
20	26.667	95	10	69	73	3.6	3.8
50	66.667	98	4	28	28	1.4	1.5
100	133.333	99	2	14	14	0.7	0.7
200	266.667	100	1	7	7	0.4	0.4