



Week in Review: 02/24/03 –03/02/03

Ron Moore – FNAL

- Store Summary / What went wrong
- Tev Studies Highlights
- Tev Ground Fault
- Shutdown + Schedule for Week



Store Summary

| Store | Initial Lumi | Deliv'd Lumi | Termination | Comments |
|-------|--------------|--------------|-------------|--|
| 2271 | 23.2 | 840 | Intentional | Shot from 143 mA; ARF4 really misbehaved |
| 2285 | 13.2 | 450 | Quench | Tried ARF4 with damper (failed) Lost 2 pbar shots due to corrupt P1/P2 trim tables Tev longitudinal damper in operation PAK3 abort kicker prefire ended store |



Frustrating Week – The Bad & The Ugly

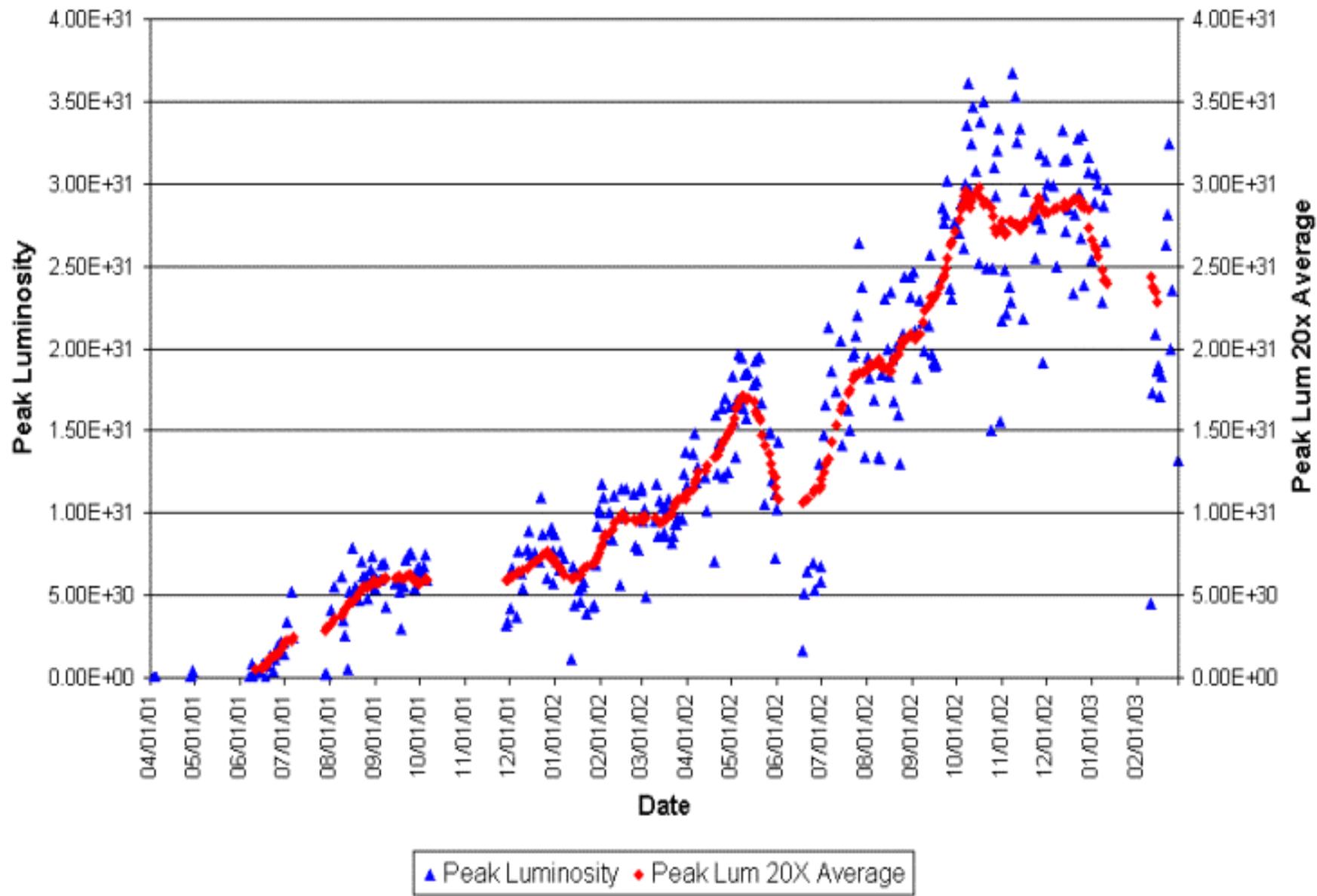
- Two shift access for CDF tracker work
- Tev turn-on PS problems (1/2 shift)
 - Initially thought to be a ground fault at feeder 23
 - A3 harmonic filter battery backup system was the culprit
- Booster hot magnets/restricted LCW flow in period 18 (1 shift)
 - Cleaned clogged strainers
- Occasional A:QDF glitches (quadrupole bus) (on/off over 2 days)
 - Glitches would kill a stack
 - Replaced electronics providing input to regulator (garbage in \Rightarrow garbage out)
- Continuing ARF4 woes – damper did not solve problems
 - Lost 40 mA from 140 mA stack; continued inconsistent behavior
 - Already restored ARF4 cavity to pre-shutdown condition (low Z)
- Proton abort kicker (PAK3) prefired, ending store #2285
- (Another) Tevatron ground fault developed between A13-3 and A14-4



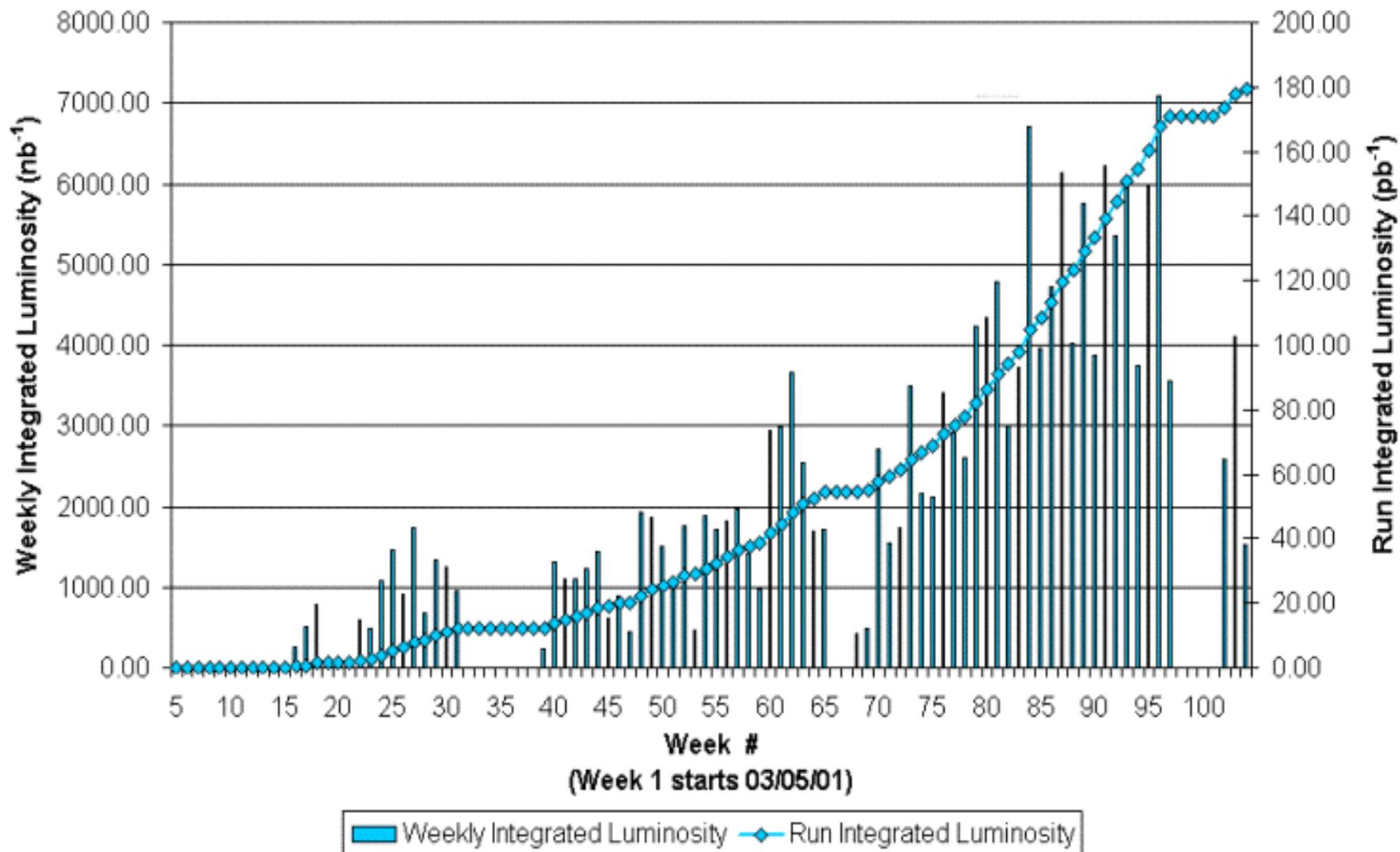
The Good

- Proton Source continued recent high performance
 - 4.9-5.0 E12 ppp on pbar target,
 - > 3 E16 protons/hr for MiniBoone ($> 4E16$ /hr no stacking)
- Tevatron longitudinal dampers recommissioned
 - Operational for store #2285
- Useful studies were performed, too.

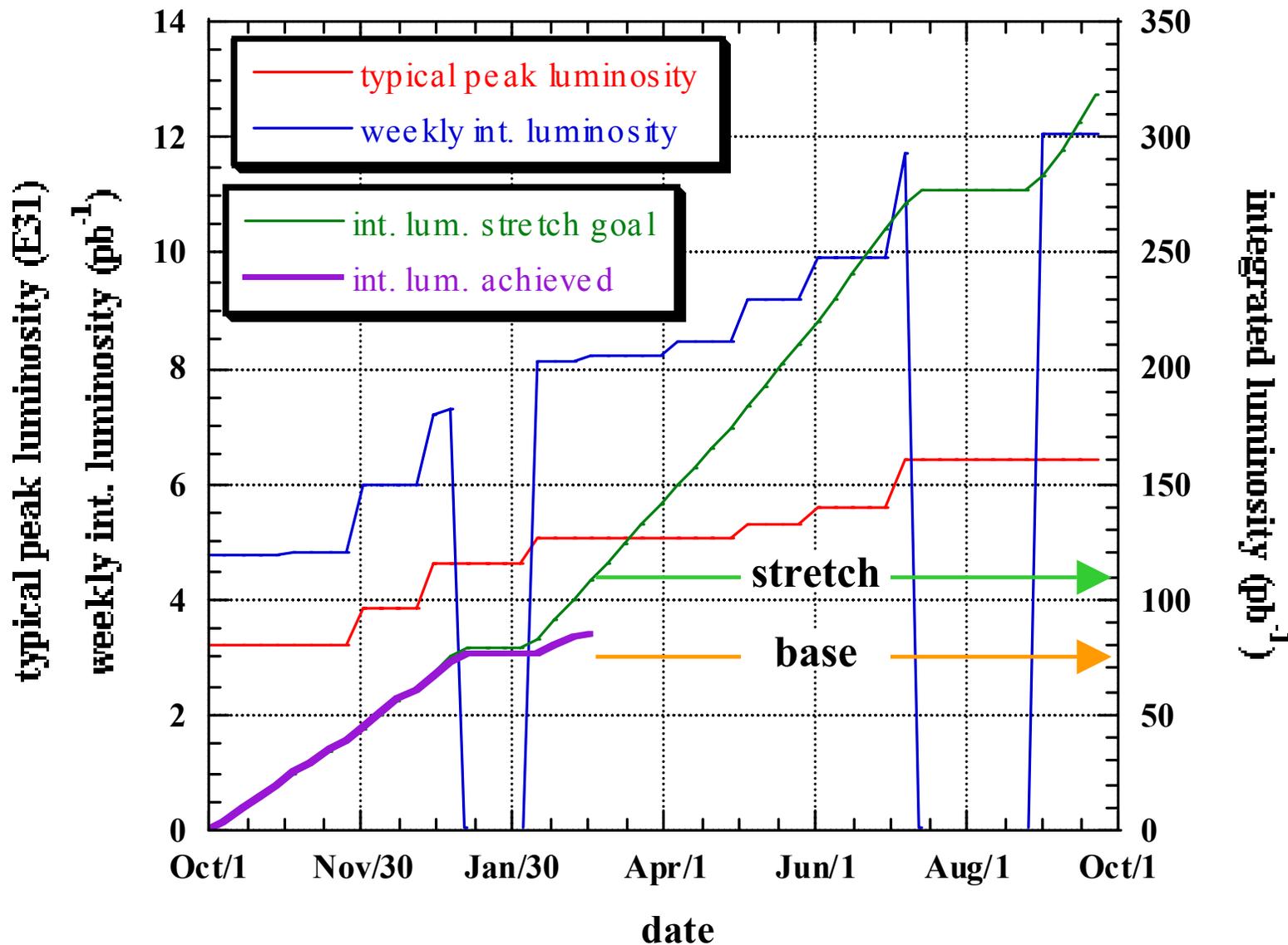
Collider Run IIA Peak Luminosity



Collider Run IIA Integrated Luminosity



FY03 Luminosity and Stretch Goal



This Tev shutdown may cause us to fall behind base goal plan.



Tev Studies

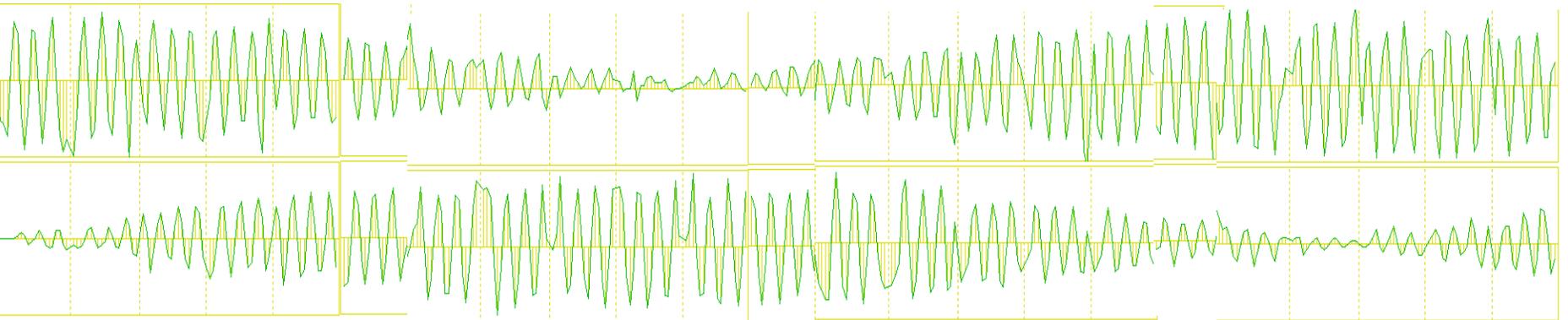
- Coupling studies @ 150 GeV
 - Kick beam horizontally in P1 line, watch betatron oscillations in vertical plane over first few turns
 - Learn how to decouple better using global/local skew quad circuits
- Proton stability vs chromaticity @ 150 GeV
 - Stable at lower chromaticities than before C0 lambertson removal
 - ⇒ Transverse impedance now lower
 - OK for single bunch, need to try with 36 bunches, use octupoles
 - Could be helpful for raising proton intensities
- Chromaticity measurements via head-tail monitor
 - Use stripline pickup and fast scope to look at oscillations of head and tail of coalesced protons
- Longitudinal tomography of coalesced protons
 - Get CERN code working at FNAL; first look at data



Coupling Study @ 150 GeV

- Beam missteered in P1 line
- T:SQ global skew quad circuit at 0 amps
- Look at betatron oscillations coupling between horz & vert
- Below are ~ 4 turns of data; 1st turn on left; scale limits $\pm 4\text{mm}$

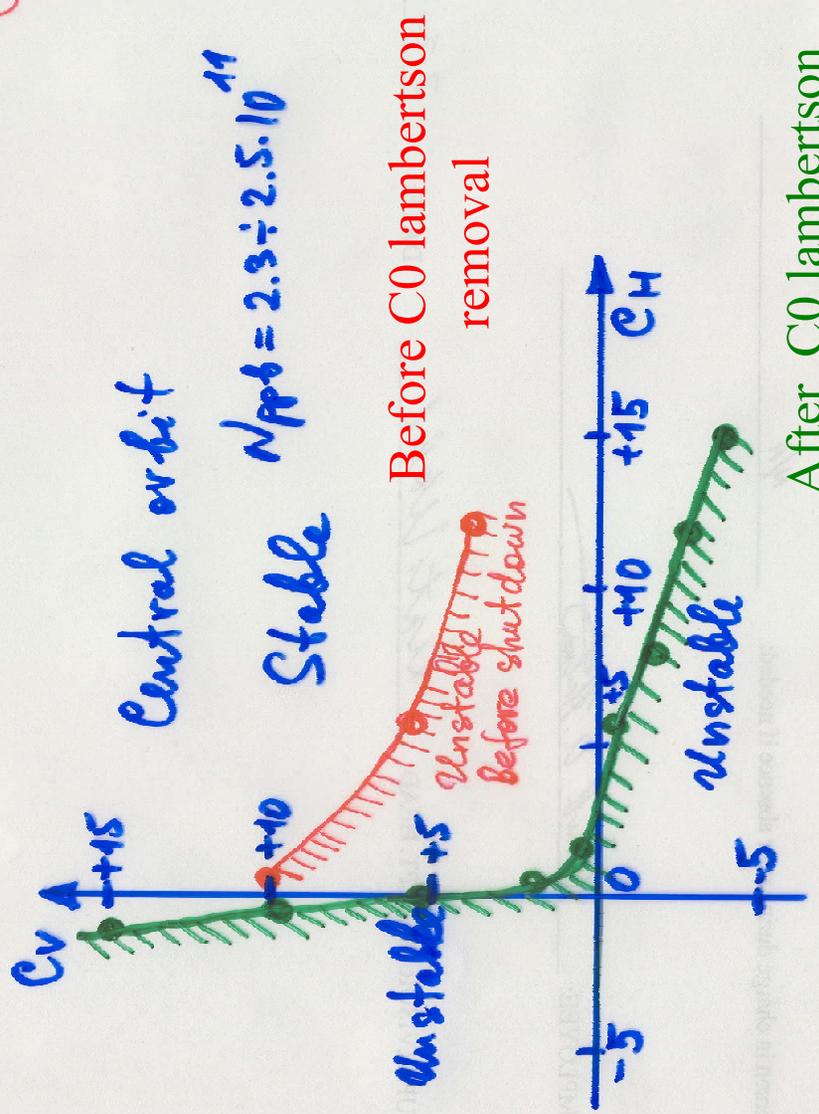
Horizontal



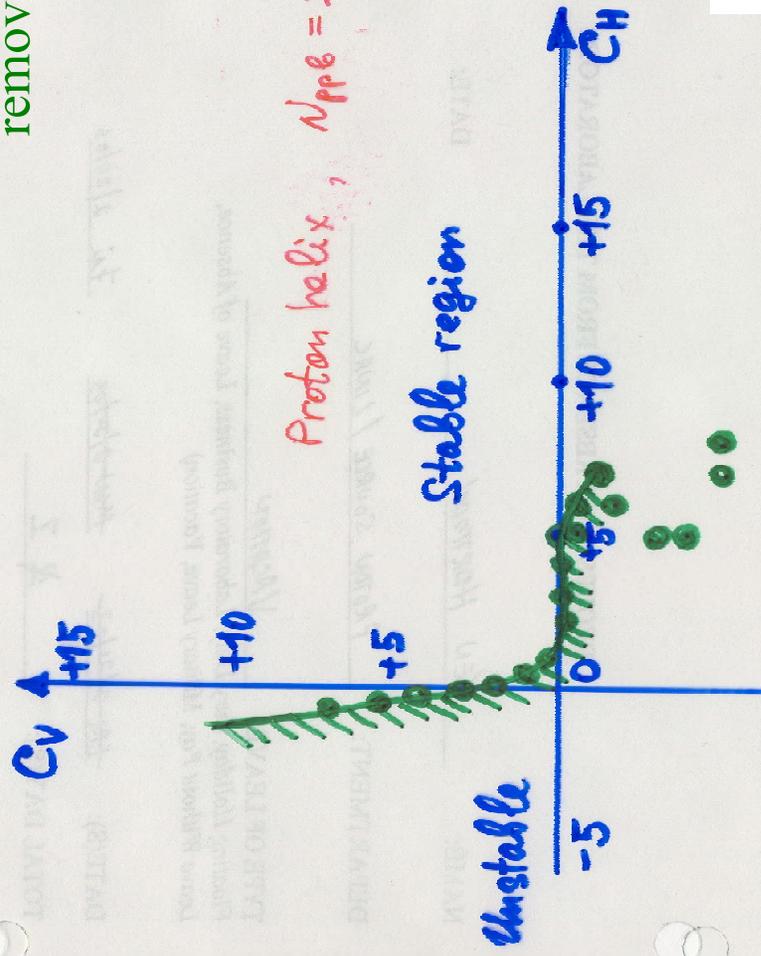
Vertical

Proton Stability vs Chromaticity @ 150 GeV

(2)



After C0 lambertson removal

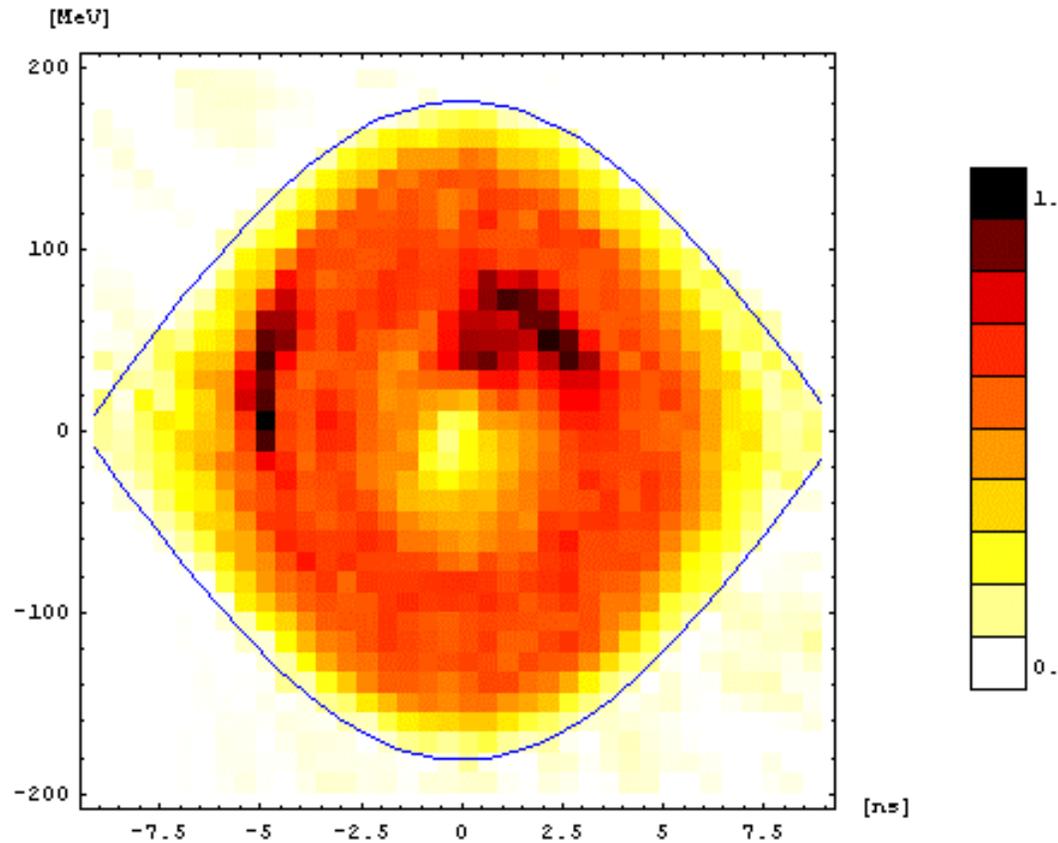
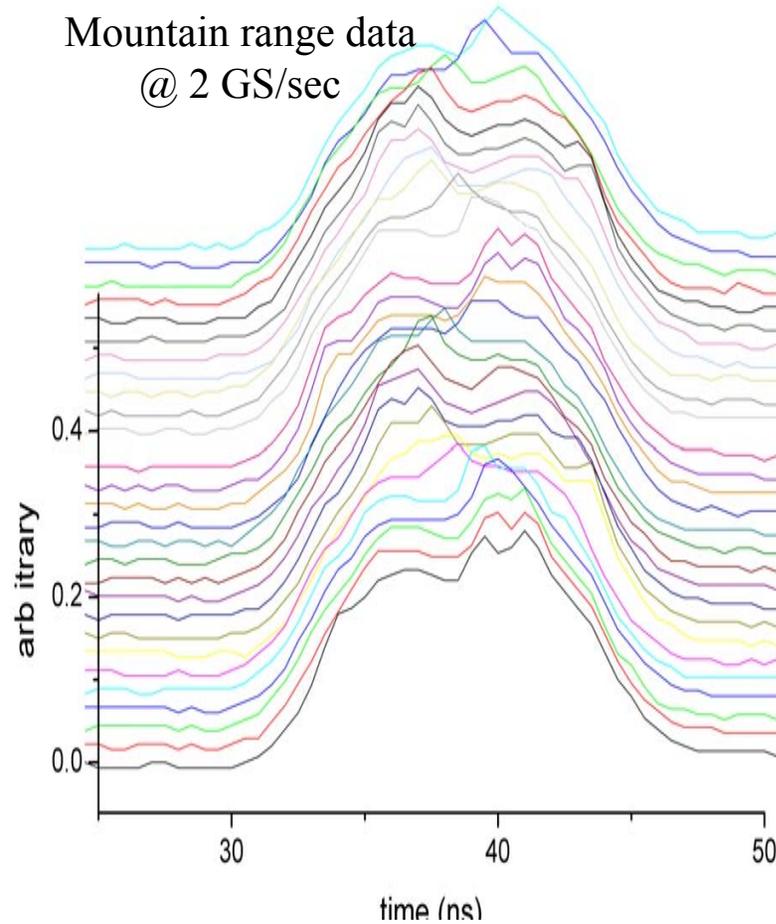




Longitudinal Tomography of Protons in Tev

Coalesced protons @ 150 GeV

Mountain range data
@ 2 GS/sec



A. Jansson



Recycler

- Took first pbars since shutdown
 - 80% transfer efficiency
- Lifetime problems related to vacuum
 - Only ~40 hours @ 30 E10 intensity
 - Compare to ~150 hours prior to shutdown
- Remove flying wire cans installed in shutdown
 - Source of vacuum problems?



Tevatron Ground Fault

- Store #2285 ended with PAK3 abort kicker prefire
- Fault found during hipot prior to access to fix weeping Kautzky valve @ B11
 - Recent Tev hipots have been very good, so this is new
- “Soft” ground fault ($\sim 8\text{k}\Omega$ to ground) isolated between A13-3 and A14-4 (6 dipoles, 1 quad, + interfaces, etc.)
- Need to warm up to help diagnosis, replace component
 - Warm up complete Tuesday afternoon



Shutdown Tasks

- Warm up Tev A1; find/repair ground fault
- Replace magnets stands, unroll quads in A1?
 - Priority list being generated; 7-8 candidates
- Remove Recycler flying wire cans, bake out
- No access to Pbar rings
- Move septum in Booster to test running without using dogleg magnets
 - Doglegs thought to be source of lattice problems
 - Restore septum to original position on Thursday
- Numerous other maintenance tasks...

| Update 3/3/03 11:41 AM (3) | MONDAY 3/03/03 | TUESDAY 3/04/03 | WEDNESDAY 3/05/03 | THURSDAY 3/06/03 | FRIDAY 3/07/03 | SATURDAY 3/08/03 | SUNDAY 3/09/03 |
|--------------------------------------|---|---|---|---|--|--|---|
| Owls 0000 to 0800 | Tev Warmup | Tev Warmup -Reduce booster intensity | Tev - Change Devices/Survey Beam from Booster , Minni boone running, Reverse protons to pbar | Tev - Leak Check Beam from Booster , Minni boone running, Reverse protons to pbar | Tev - Leak Check Beam from Booster , Minni boone running, Reverse protons to pbar | Tev - Hipot & Signoffs Tev Cooldown | Tev - Cooldown |
| DAYS 0800 to 1600 | NTF-PT Tev -Warmup -tevatron as founds RR -1300-1800 as founds FW -remove shielding Pbar ML/RR shots | NTF - PT Tev -Warmup Pbar shot to Mi Noon RR FW wire removal Booster septa move | Tev - Change Devices/Survey Beam from Booster , Minni boone running, Reverse protons to pbar | NTF-PT Tev -Leak Check RR - access fire TSP's Booster Put septum back (survey) Linac - pa replacement | Tev - Leak Check Beam from Booster , Minni boone running, Reverse protons to pbar | Tev - Cooldown | Tev - Cooldown Tev Cold |
| EVES 1600 to 2400 | Tev -Warmup stacking and mini boone running | Find Bad Magnet(s) RR FW cans out | Tev - Leak Check Beam from Booster , Minni boone running, Reverse protons to pbar | Tev - Leak Check Mi turn on Beam from Booster , Minni boone running, Reverse protons to pbar | Tev - Leak Check Beam from Booster , Minni boone running, Reverse protons to pbar | Tev - Cooldown | Tev Startup Shot Setup ? |

Schedule can be found at <http://www-bd.fnal.gov/operations/schedules.html>



Summary

- Only 2 HEP stores this week
 - Lots of downtime: Booster, Pbar, Tevatron
- Shutdown to warm up Tev to find A1 ground fault
 - Will access other machines, too, during this time
- Turn-on MI Thursday evening
 - Resume MiniBoone, pbar operations
- Tev cold sometime Sunday, Mar 9