

Tevatron progress: Mar'03 to mid-May'03

- Luminosity: (average initial peak L)
 - mid-March (5 stores #2315-2328) $L=37.0$
 - mid-May (6 stores #2538-2555) $L=42.8$
 - **Gained 16% in peak luminosity:**
 - *+15% in protons, +8% in pbars, -7% in emittance (blown)*
 - record L as of Mar.20 $40.7e30$ store #2328
 - record L as of May.30 $44.9e30$ store #2555
 - lifetimes of L , N_{pbar} are ~the same, N_{p} improved (40 hrs \rightarrow 140 hrs), eff-emittance dropped (45 \rightarrow 19hrs)

Operations/Reliability:

- 9.1 pb-1/week (record)
- helpful global orbit smoothing/tuning (MikeM)
- improved proton efficiency, kicker, 90% helix (Bruce)
- higher pbar background @ D0
- (5) quenches with uncoal beam at 980 – not understood
- collimators stuck (2 stores) – fixed (Dean)
- dampers “fight” fixed by adj local coupl (Tan/Jim)
- HE17/QA42 tripped; QA7 wrong in few stores – fixed
- DC Pbar beam (?) = quench on ramp
- more pbars lost on ramp, after initiate collisions, regular “scallop”, regular instability at 980 and after seq.25

Tevatron Beam Physics Progress:

- Lattice msmnts (Val), 15% b wave (Meiqin), and fix (JJ)
- F0 Lamberston major impedance source 3MW/m (PI,AB)
- Smart bolts \rightarrow coupling, D_y as model (MikeS, Don, Jerry)
- 1st indication of BBCompensation (TEL team)
- Dancing bunches analyzed, paper (RM, Ng, ValB)
- Beam-beam studies $t \sim N_p^{-(1-2)}$ - not completed (TS+)
- 5* helix (Yuri+MikeM) – slow progress
- Octupoles $\rightarrow C_{v,h}=0$ at inj (Peter) – not operat'nal yet
- Strange loss rate vs helix EoS (XL)
- no operational progress in inj emittance...

Misc. :

- Good BD seminar on Tev status (MikeM, Tan, JimS)
- 7 participants, 17 papers at PAC'03
- MCR training for 3 finished (Jerry)
- Letters of Recognition: Kuznetsov, Hanna, Bolshakov
- Update of beam studies Web page (Dean)
- Coated HV separators – started (J.Walton, G.Romanov)
- Run II Upgrade work/Director Review (VL, JA, MM, VS)
- Tough situation with studies: in average <9 shifts/month, sometimes not much progress, limited success, “bad luck”

Tevatron Diagnostics:

- New Schottky evolves in great instrument (RP,JS,VS)
- Sure $C_{v,h}$ from “head-tail” (Vahid), 20GS/s scope (Eug.L)
- DC beam is seen by SL (Harry)
- Good S/N from 21MHz Schottky for Q-tracker (Tan)
- BPMs “review ready” (JS), promising quartz filters(Tan)
- On-line magn measmnts at MTF – started (P.Bauer)
- QXR quads installed (Andreas, Jim Volk)
- $SL=15p+0.6xFW$, D_h meas’d (AJ,JS,PL,N), still no faith
- slow progress in getting luminous region data on-line (JS)
- SBD/FBI calibr, SBD cable dispersion corr’d (AT,BF,SP)
- Lumberjack Array Viewer (Timofei)
- IPM and Alignment projects on god track (AJ, Ray, JimV)

Next Two Months:

- Operation/Maintenance:

- Install, commission inj-dampers (JimS, Tan)
- Proceed fast with shutdown projects:
 - F0 liner (Peter, Jim Volk)
 - A48 (Ron)
 - Alignment: rolls, quads, stands, smart bolts, HLSs (Ray, J V)
 - Vacuum (Bruce)

- Beam physics issues (in order of priority):

- New helix → reduce loss on ramp, LB (Yuri, MM) 10%
- Emm at injection (TeV, beamlines) (MikeS, Val, JA) 10%
- Octupoles or dampers on ramp, 980, seq25 (PI, Tan) 10%
- Beam-beam studies & Compensation (TS&Co, TEL)
- Misc (lattice, IBS, DC beam, etc)

Next Two Months (cont'd):

- **Diagnostics:**

- Tev BMP review (JimS)
- $C_{v,h}$ and coupling from tunefitter (Paul L)
- $C_{v,h} Q_{v,h}$ and coupling from head-tail (Vahid)
- Pbar tunes from old Schottky (Markus, Paul L)
- Pbar/p bunch $Q_{v,h} C_{v,h}$ from new Schottky (RP, AJ, JS)
- Continue on SL vs FW vs coll (AJ, JS, Stephen)
- Continue work luminous region data on-line (Jean)
- Continue IPM work (Andreas+)

- **Misc:**

- DoE Review (July)

Next Two Months: Expectations

- Last time it was “... *we are around 45-51 mid-May '03*” - still at 44.9e30
- Over next 2-2½ months, I expect:
 - reduced time for studies (just maintenance)
 - possible improvements
 - 5-10% more protons (from MI, better in TeV - octup?)
 - 5-10% more pbars (larger stack, part of new helix commiss'd)
 - 5-10% smaller emittances (scallop tuned, injection improved – dampers, or mismatch fixed)
- As the result, I expect we'll be around 45-51e30 by Aug.1, 2003