

# *Beams Week in Review*



- Accelerator Performance
  - Five stores
  - Accelerator Study Period
  - Store 1787 Average Peak Luminosity:  $3.05 \text{ E}31$
  - Dreadful weekend

# *Beams Week in Review*



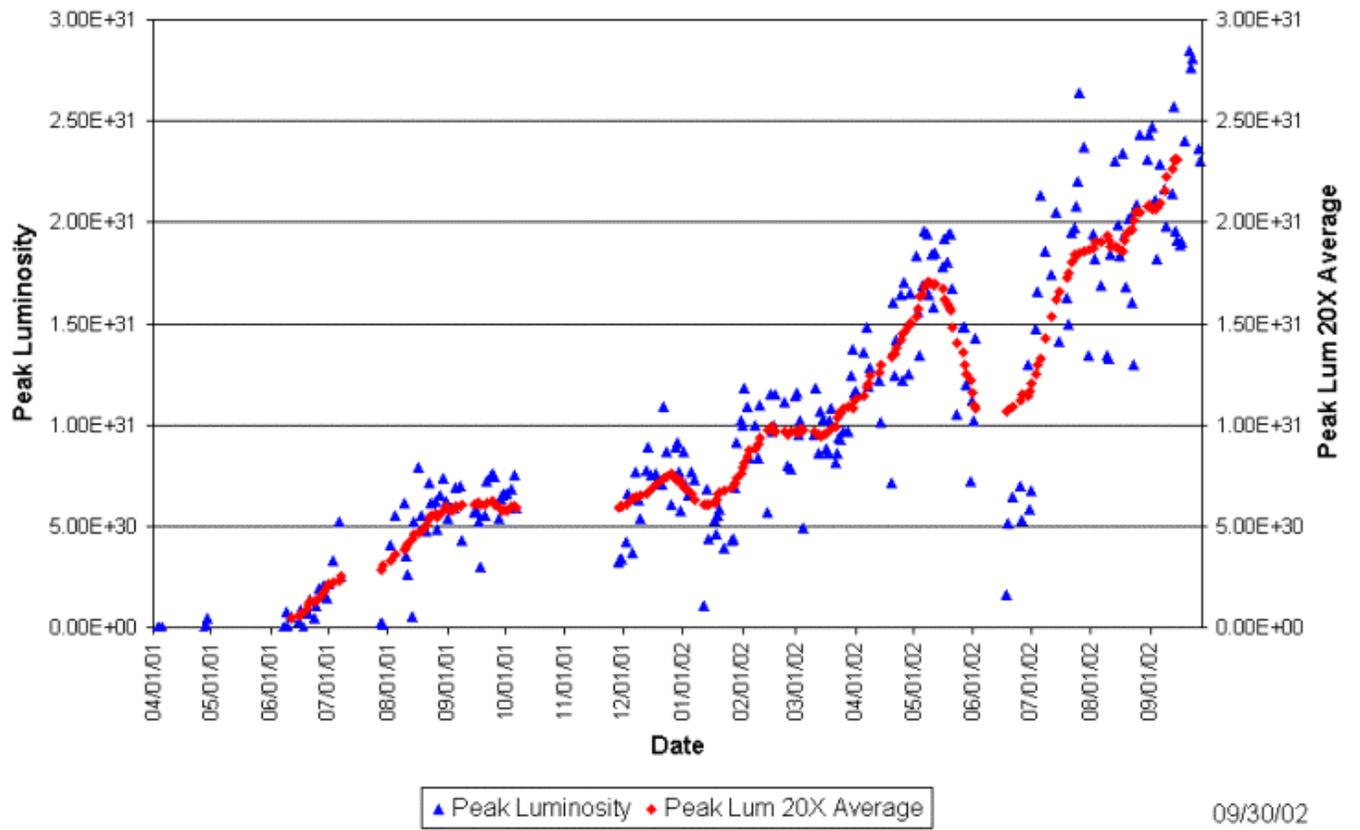
- Notable Changes and Improvements

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# Peak Luminosity



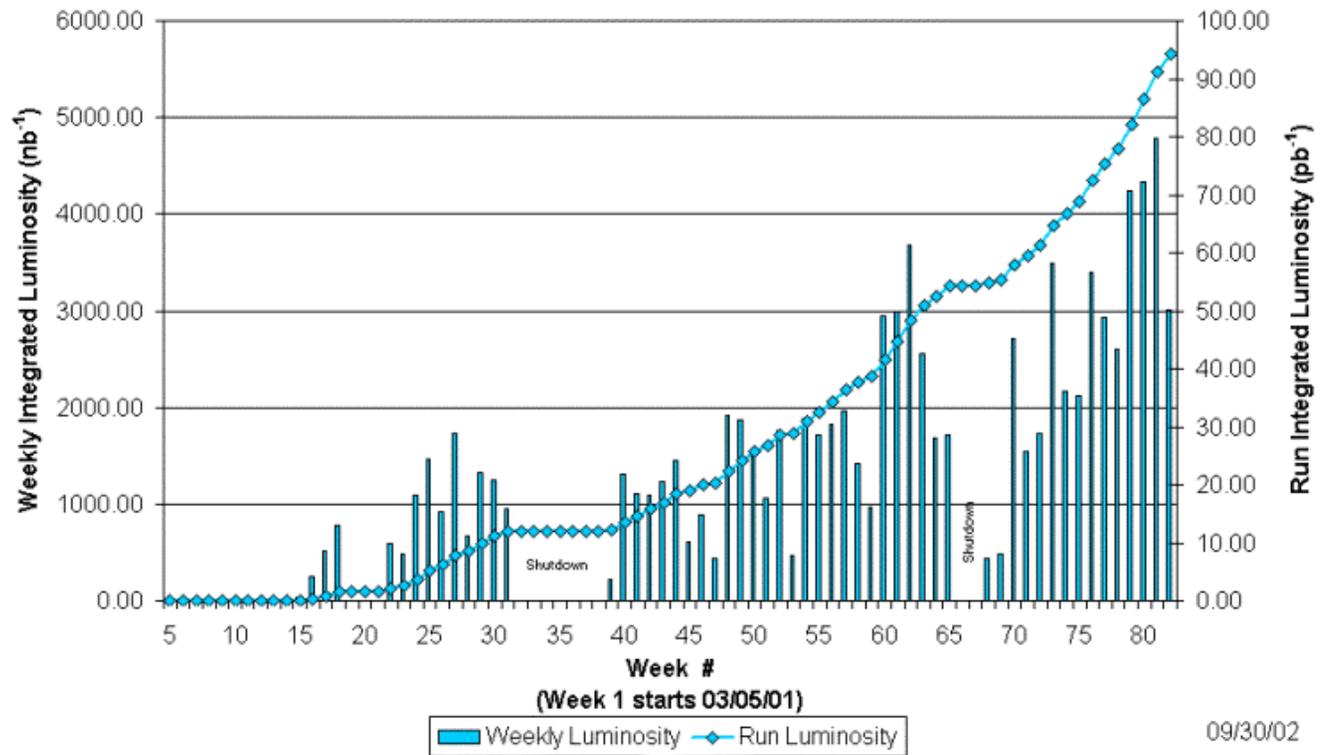
Collider Run IIA Peak Luminosity



# Integrated Luminosity



Collider Run IIA Integrated Luminosity



# Beams Week in Review



- Current Issues

- Increase the number of protons through MI coalescing
- Increase MI pbar coalescing efficiency to the 80 - 90% level
- Reduce proton and pbar bunch length into tevatron
- Increase proton and pbar lifetime at 150 GeV
- Reduce losses of proton and pbar on ramp
- MI – Tevatron transfer line matching
- Increase Luminosity lifetime
- Improvement in pbar stacking rate

# *Accelerator Studies*



- Major focus for studies *should* result in near term gains in Luminosity

# *Accelerator Studies, Tevatron*



- Tevatron Tune and Coupling Drift
  - Operational
  - Tune drift from  $> 0.01$  units to  $< 0.001$  units
  - Coupling drift from  $> 0.02$  units to  $< 0.003$  units
- Tevatron Dampers (two shifts)
  - Horizontal damper beginning to be integrated into shot set up
  - Vertical dampers, ready to commission with beam

# *Accelerator Studies, Tevatron*



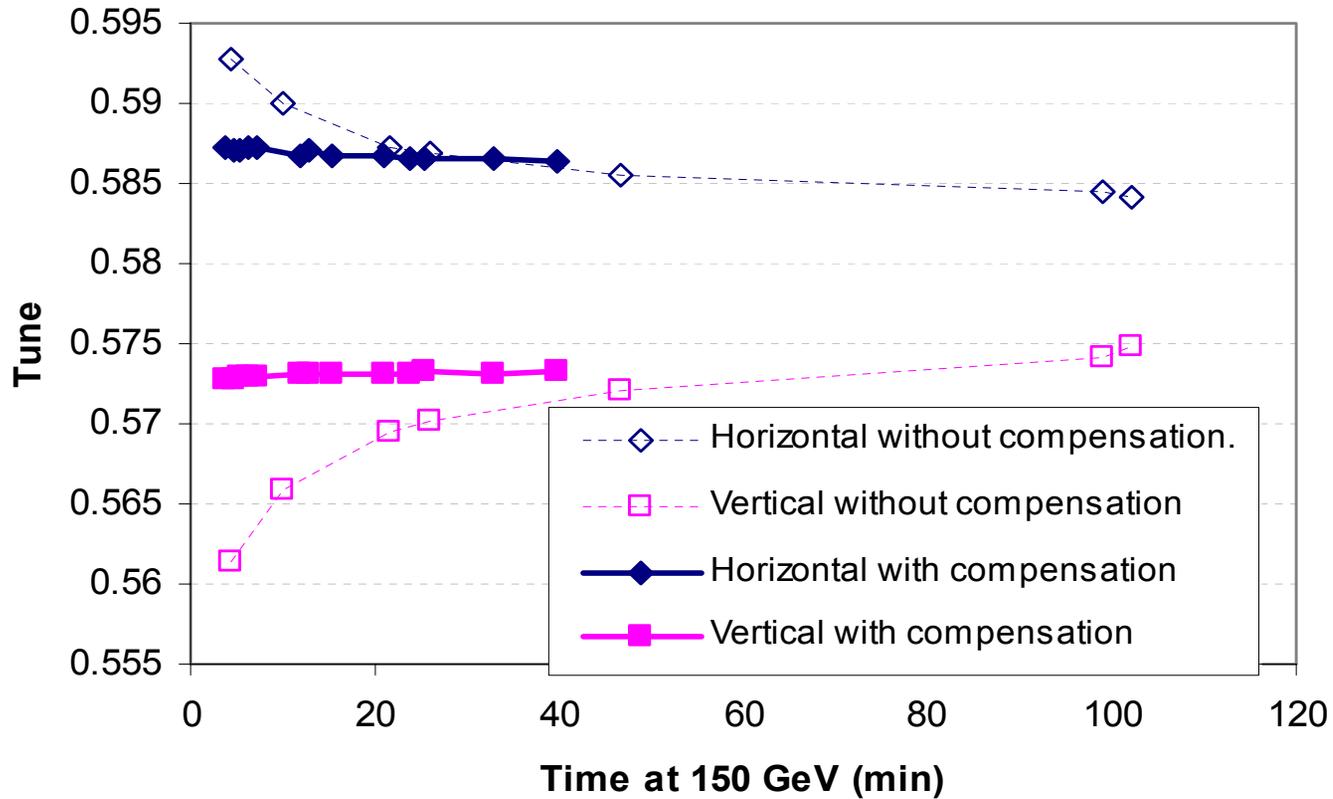
- MI-Tev lattice matching for A1 and P1 transfer lines
  - Data taken and being analysed
- Loss on ramp vs longitudinal emittance
  - Data taken and being analysed.
  - Preliminary analysis indicate increased loss with proton bunches of higher intensity and longer bunch lengths.

# *Accelerator Studies, Tevatron*

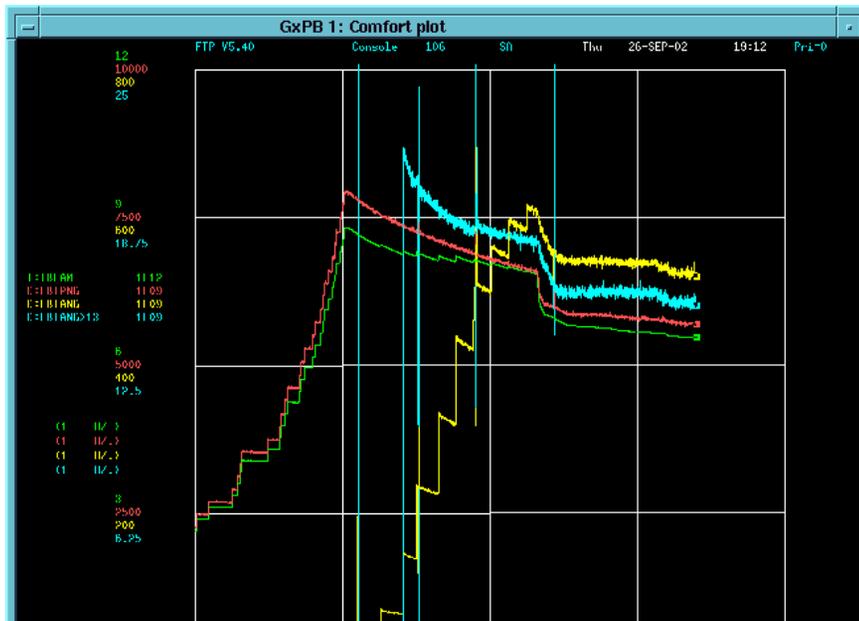


- 150 Gev and 980 Gev lifetime optimization using octupoles
  - The octupoles show promise for suppressing instabilities at very low values of chromaticities.
  - Have demonstrated this fact both at injection and low beta for proton only beams on the central orbit and proton helix, respectively.

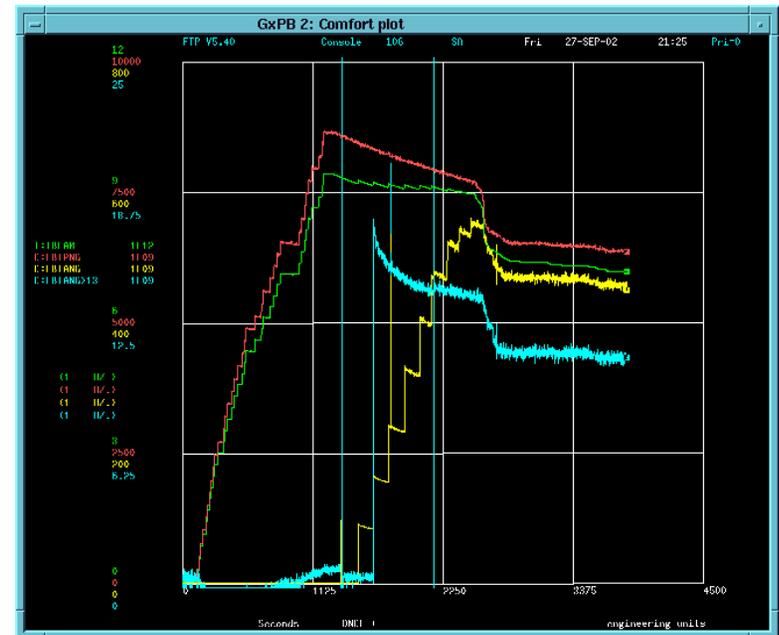
# Tune and Coupling drift



# Horizontal Transverse Dampers



Damper off



Damper on  
Chromaticity lowered by 2 units

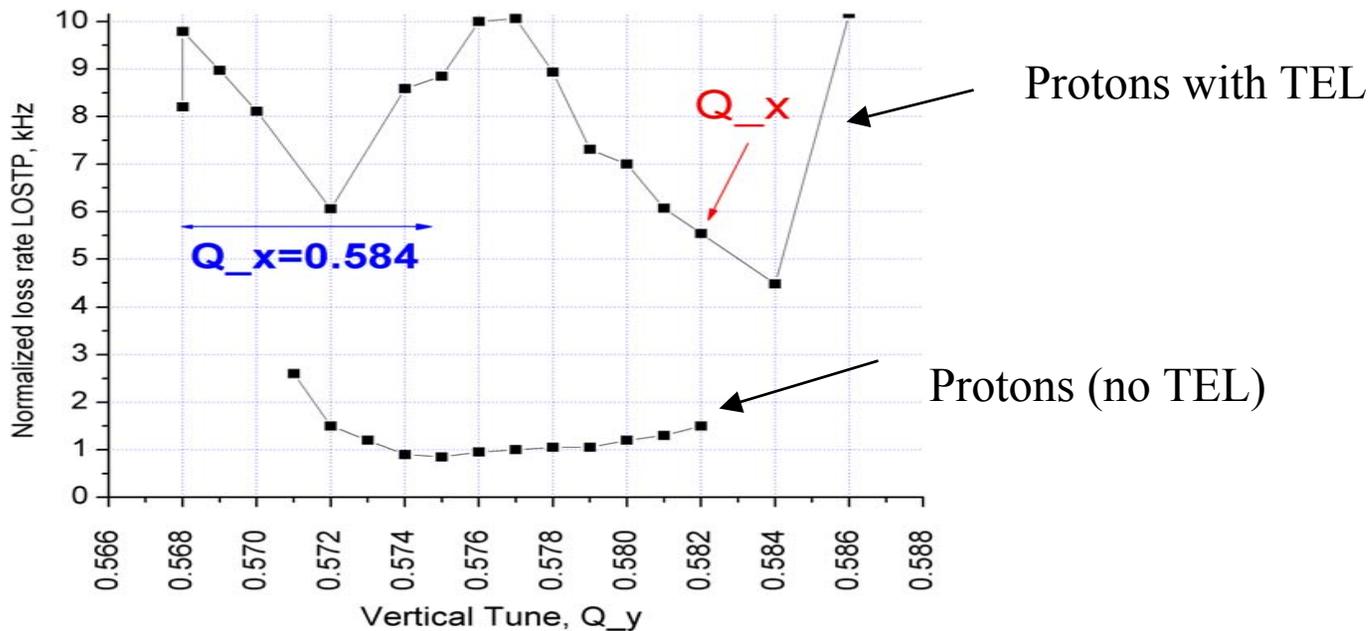
# Tevatron Electron lense



Simulation on beam-beam force on pbars Used TEL adjusted to collide with protons

-Want to move the pbar tunes closer to the diagonal

Tune scan at 150 with TEL On/OFF,  $Q_x=0.582$  (80 mA, 6kV)



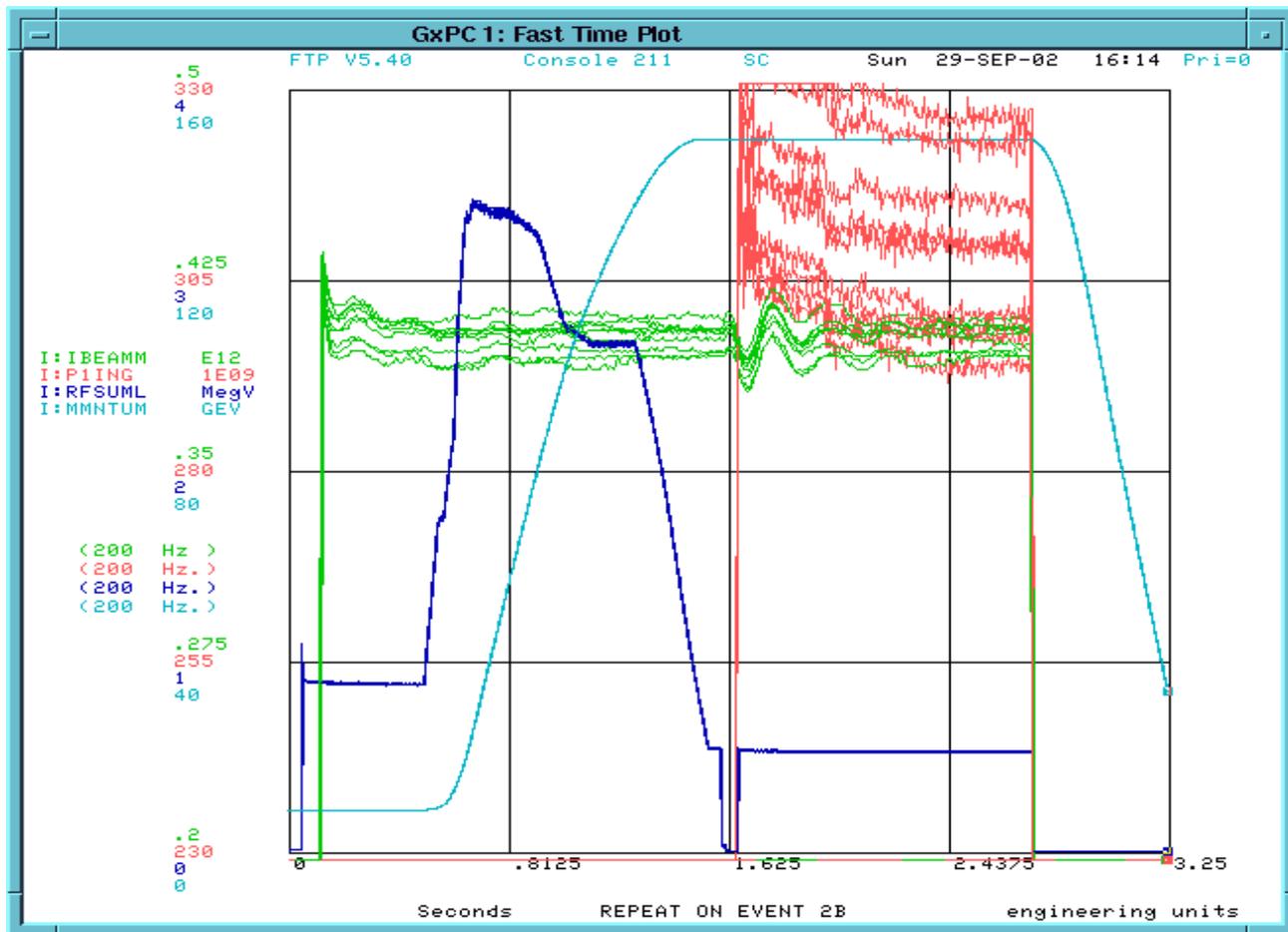
# *Accelerator Studies, Main Injector*



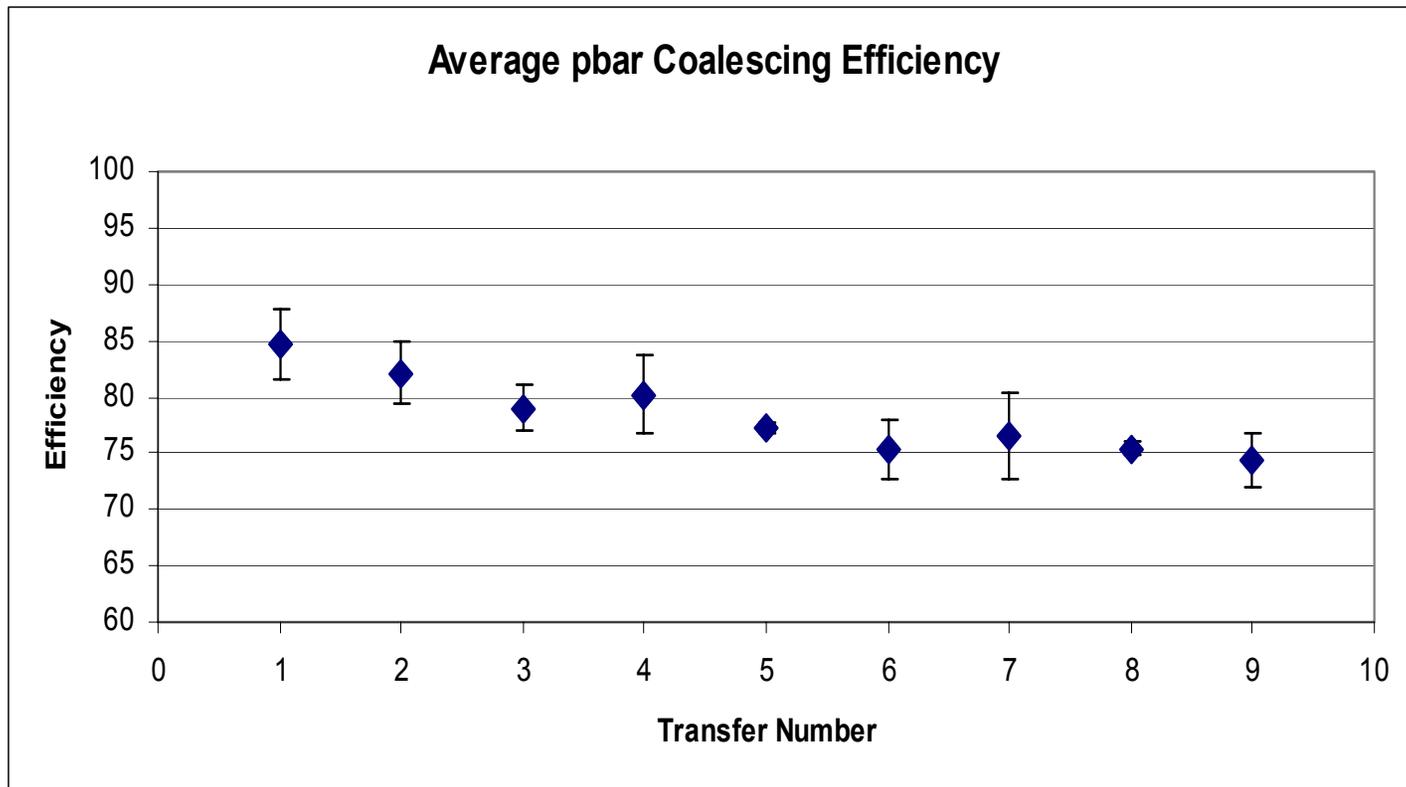
- Reduction of longitudinal emittance for proton coalescing
- Main Injector 150 Gev lattice function measurement using TBT
- Tev-A1-MI optics verification
  - Using reverse protons from tevatron
  - First turn flash orbit

# Proton Coalescing

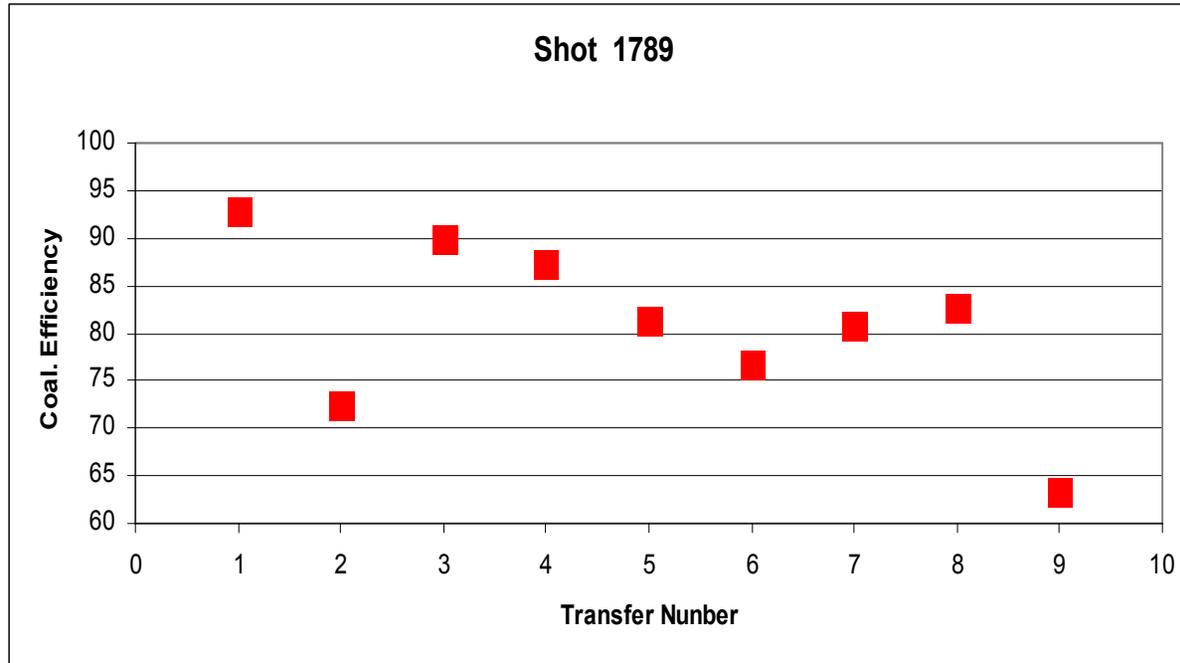
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# *Pbar Coalescing*



# *Pbar Coalescing*

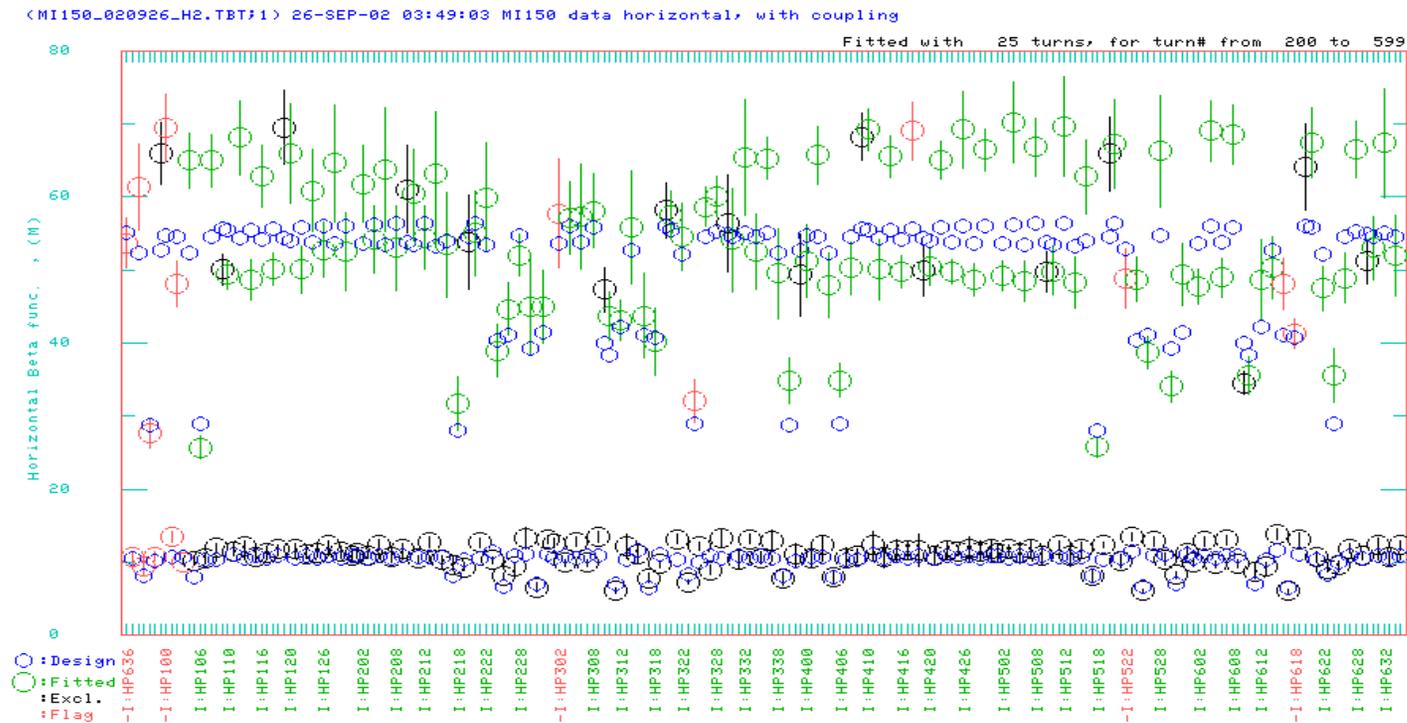


2<sup>nd</sup> transfer : we were optimizing the paraphase angle between A and B pots  
8<sup>th</sup> and 9<sup>th</sup> transfers were done with identical settings of A and B pots.  
There were more than 13 pbar bunches at injection in MI on 9<sup>th</sup> transfer  
and hence coalescing efficiency is expected to be poor.

# Main Injector Lattice 150 GeV



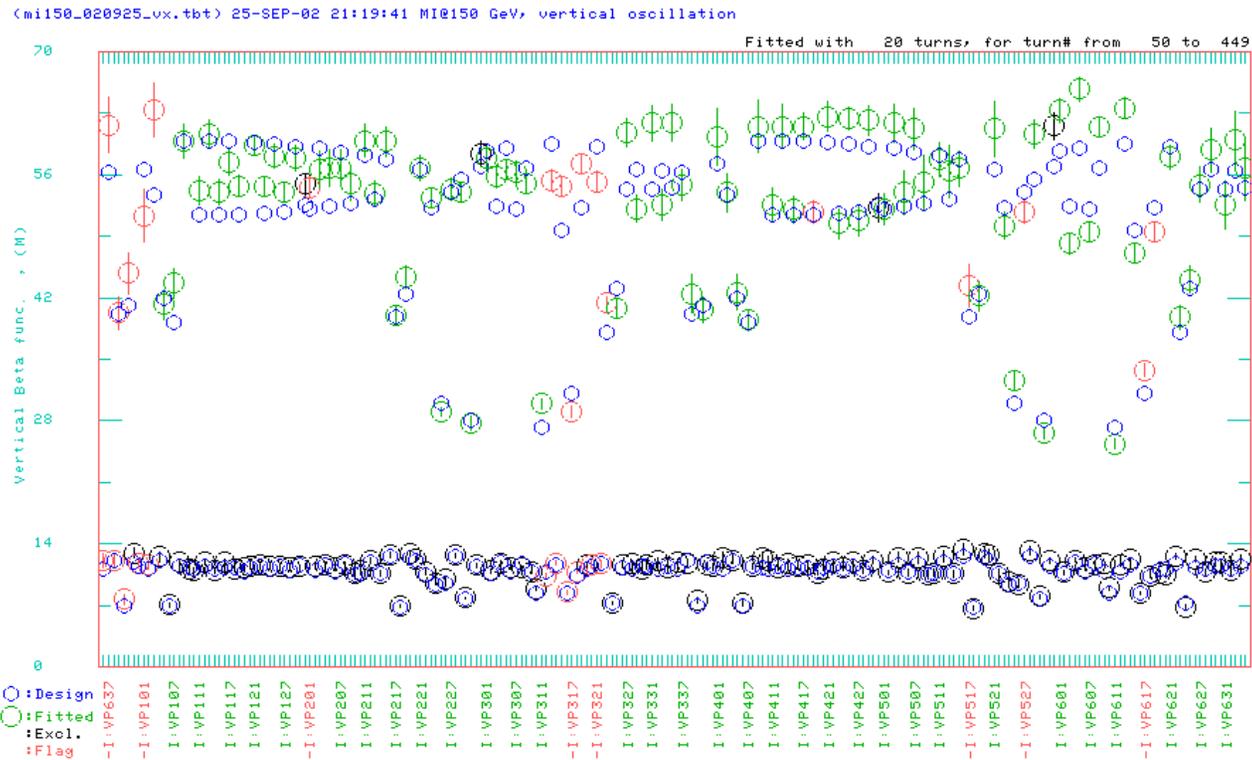
## Horizontal Lattice Measurement, TBT at 150 GeV



# Main Injector Lattice 150 GeV



## Vertical Lattice Measurement, TBT at 150 GeV



# *Accelerator Studies, Pbar*



- Re-phasing Debuncher cooling systems
- Characterization of AP2 aperture
- Characterization of Debuncher aperture

# *Schedule for this week*



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- Stack 'n Store Week
  - Tevatron Store Monday 1400 and Tuesday around noon
  - Resume Collider Operation Late Wednesday evening or early Thursday Owl shift
- *12-16 hr access Wed starting at 6AM*
- *Tevatron Maintenance*
- *Pbar shots to Recycler*

# Schedule for this Week

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Update 9/30/02 2:38 PM	MONDAY 9/30/02	TUESDAY 10/01/02	WEDNESDAY 10/02/02	THURSDAY 10/03/02	FRIDAY 10/04/02	SATURDAY 10/05/02	SUNDAY 10/06/02
<b>Owls</b> <b>0000</b> to <b>0800</b>	<b>Phar</b> - Stack  <b>TeV</b> - Studies	<b>Stack and Store</b>	-stacking  -shots to recycler  -Stacking  0600 prepare for te controlled access	SHOT SET UP  			
<b>DAYS</b>  <b>0800</b> to <b>1600</b>	<b>Phar</b> - Stack  <b>TeV</b> - 1400 Shot	<b>NIF - PT</b>  <b>Stack and Store</b>  -Shoot midday	<b>NIF - PT</b>  -TeV access 0700-1600  -Stacking  -Beam to mini boone		<b>NIF - PT</b>		
<b>EVES</b>  <b>1600</b> to <b>2400</b>	<b>Stack and store</b>	-stacking	-1630 TEV PS start up  -STACKING  -2000 possibly DO access over. TeV beam start up				

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