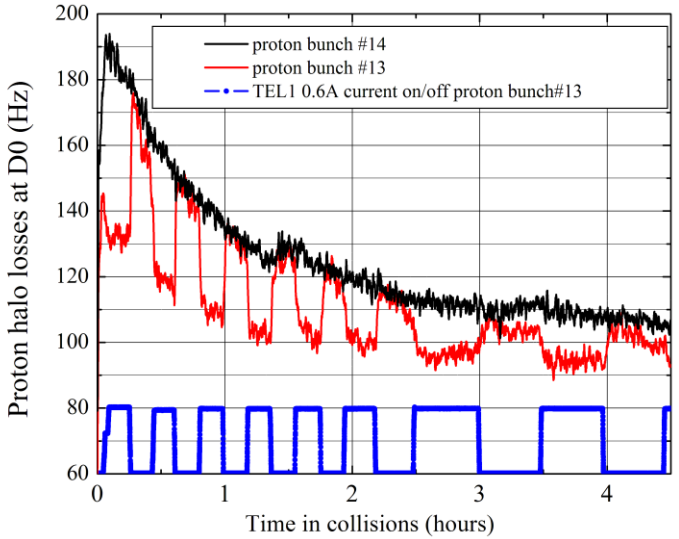
Theory & Simulations Group

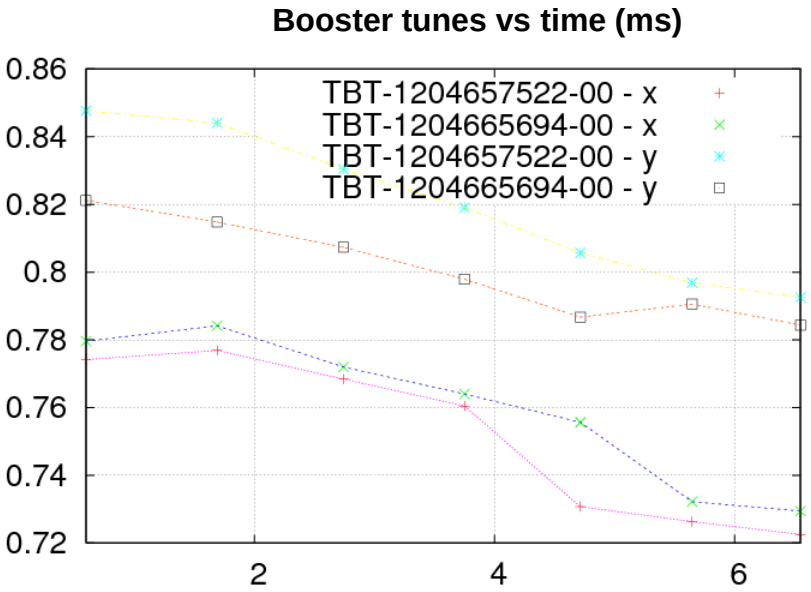
People	Positions	Projects
Y. Alexahin	Sci.II (GL)	Run II, MC, PP-II, LARP
V. Balbekov	Sci.II	MC, PP-II, ILC
N. Gelfand	Sci.II	Run II, MC, PP-II
E. Gianfelice-Wendt	Appl. Phys.	Run II, MC, PP-II, LARP, ILC
V. Kamerdzhiev	Research Ass.	Run II, LARP
G. Kuznetsov	GS	Run II, LARP, MC
L. Vorobiev	GS	PP-II, Project X
V. Kapin	Visitor	Run II, PP-II

Run II



- TELs for BBC and abort cleaning
  - new SEFT guns designed and installed at TEL1 and TEL2
  - p-lifetime improvement demonstrated with both TEL1 and TEL2
  - new gun with control grid for bunch-by-bunch operation was designed, built and now is being tested
  - TELs are now used for abort cleaning during pbar injection as well
  - using ELs in RHIC and LHC is under consideration
- Optimization of Helical Orbits in Tevatron
- TBT Optics Measurement and Correction
  - console applications for coupling correction at injection and acceleration are routinely used for Tevatron tune-up
  - new method for coupled optics reconstruction from TBT data is being developed
- Tevatron Digital Tune Monitor
- Analysis and Correction of Tevatron Orbit and Tune Drifts

Proton Plan II → Project X



- Space Charge Effects in Booster, RR, MI

  - using Mathematica + MAD the SC effects in Booster were analyzed and shown to be particularly harmful in the presence of large optical irregularities

  - SC simulations with ORBIT are going on for RR and MI (bugs in program found and corrected)

- TBT Optics Measurement and Correction

  - methods developed for Tevatron are applied to Booster and MI

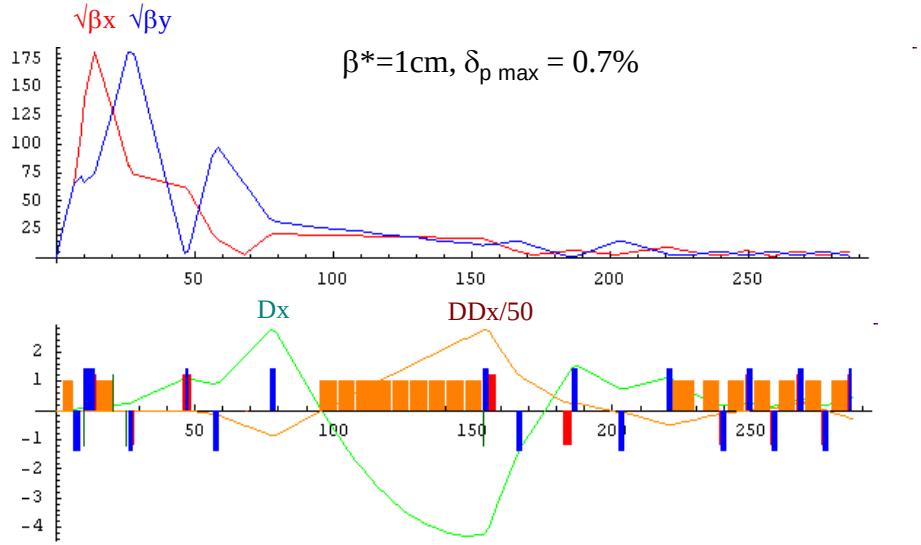
  - MI impedance determined from phase advance and orbit dependence of beam intensity (within theoretical expectations)

- Coherent Instabilities in High Intensity Proton Beams

  - e-cloud in MI simulations with ORBIT were undertaken, for this purpose ORBIT was augmented with multibunch option (but the e-cloud block itself needs complete overhaul)

  - analytical study of transverse instability of rigid and non-rigid modes in space charge dominated beam

Muon Collider



- Muon Collider Ring Design
  - previously proposed lattice designs analyzed
  - conceptually new design proposed (local CC in IRs + neg. dispersion section)
- 6D Ionization Cooling Channel Design
  - theory of HCC with distributed RF revisited
  - new principle of resonant dispersion generation proposed
  - schemes for PIC in achromatic ring and HCC analyzed
  - effect of SC in PIC and “super-Fernow” channels clarified
- MANX: Ionization Cooling Demonstration Experiment
  - simulations studies of 5D cooling (no RF) performed
  - engineering issues of incorporating HP RF
- High Gradient Dielectric Wall Acceleration Structure for Muons

Theory & Simulations Group

2007 Paper Trail

- 3 journal articles (on BBC and TELs)
- 14 PAC07 reports
- 13 workshop talks (mostly on MC)
- 13 internal reports

2008 Deliverables

- Installation and commissioning of electron gun with control grid
- Development and commissioning of TELs multibunch operation scheme for BBC
- Expanding DTM for both planes for protons and antiprotons
- Application for coupled optics reconstruction from TBT data and correction
- Experimental study of 12^{th} order resonance intrinsic cancellation in Tevatron
- Analytical study of transverse instability of non-rigid modes in space charge dominated beam in RR at PP-II parameters
- MC ring lattice update for HE (baseline) parameters
- Segmented HCC design with alternating block solenoids
- Muon acceleration scheme based on DWA structure