

# Highlights from COOL07

- COOLxx: Series (biennial) of workshops on “Beam Cooling and related Topics”:
  - ~70 attendants
  - Topics:
    - electron cooling,
    - stochastic cooling,
    - ionization cooling, laser cooling
    - related topics, e.g. instabilities, cristallization
  - International:
    - 2005 in USA
    - 2007 in Bad Kreuznach (Germany) - organized by GSI
    - 2009 in Lanzhou (China)
  - Since “my” last workshop in 2003:
    - Not many fundamental new developments,
    - Some projects implemented, new projects proposed.

ABP/LIS section meeting 1<sup>st</sup> October, 2007

# COOL 07

## Workshop on Beam Cooling and Related Topics

September 10-14, 2007  
Bad Kreuznach, Germany  
(organized by GSI, Darmstadt, Germany)

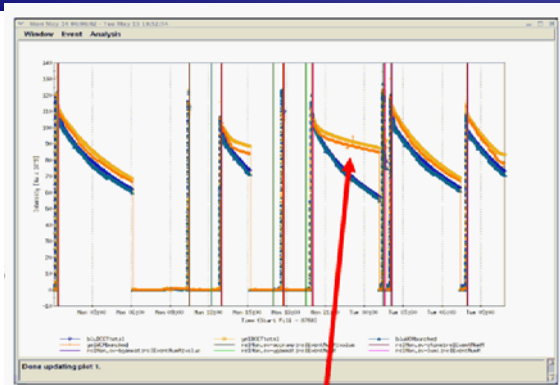
The workshop will highlight the state of the art in electron cooling, stochastic cooling, muon cooling, and storage of particles in antiproton and heavy ion traps. Presentations of new developments and techniques as well as of the status of existing and future facilities are invited.

The workshop will be held at the Parkhotel in Bad Kreuznach, a health resort in the center of Germany's Nahe wine growing area.

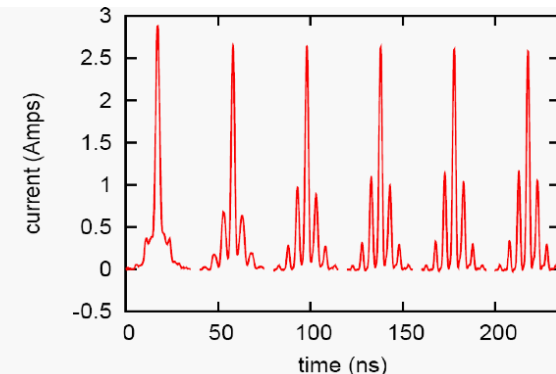
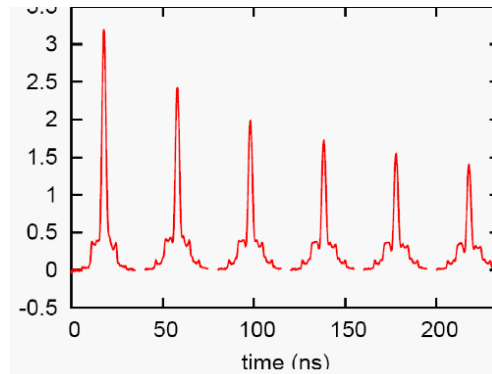
*International Program Committee*  
Itan Ben-Zvi, BNL, Brookhaven, USA  
Håkan Danared, MSL, Stockholm, Sweden  
Yaroslav Derbenev, TJNAF, Newport News, USA  
Dan Kaplan, IIT, Chicago, USA  
Kwang-Jia Kim, ANL, Argonne, USA  
Igor Meshkov, JINR, Dubna, Russia  
Dieter Mähl, CERN, Switzerland  
Yoshiharu Mori, KEK, Tokyo, Japan  
Sergei Nagaitsev, FNAL, Batavia, USA  
Akina Noda, Kyoto University, Japan  
Vasily Parkhomchuk, BINP, Novosibirsk, Russia  
Ralph Pasquinelli, FNAL, Batavia, USA  
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Andrew Sessler, LBNL, Berkeley, USA  
Markus Steck, GSI, Darmstadt, Germany  
Gérard Tranquille, CERN, Switzerland  
Hong Wei Zhao, IMP, Lanzhou, China



# RHIC: bunched beam stochastic cooling



This was the first store with cooling running in the Yellow ring

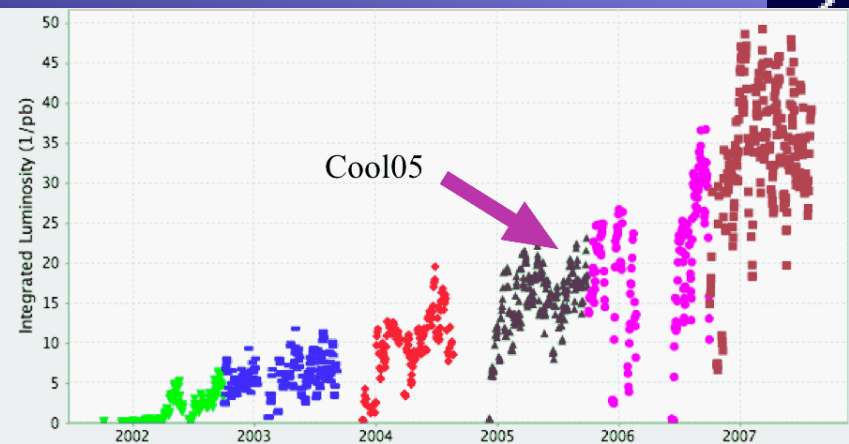
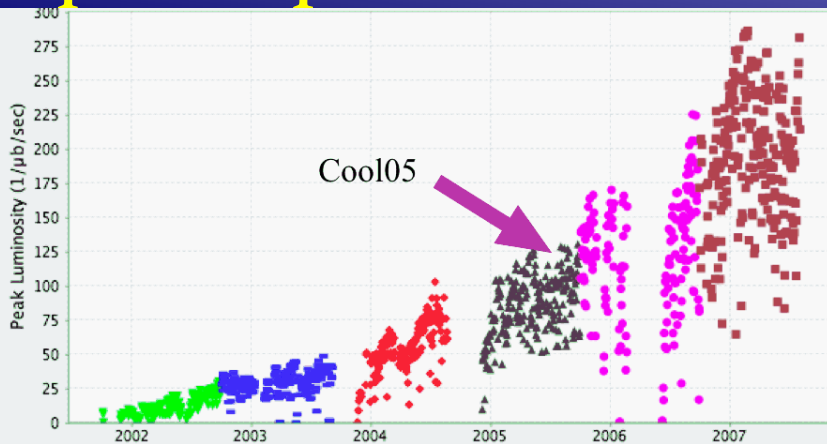


Evolution of the bunch shape without and with cooling

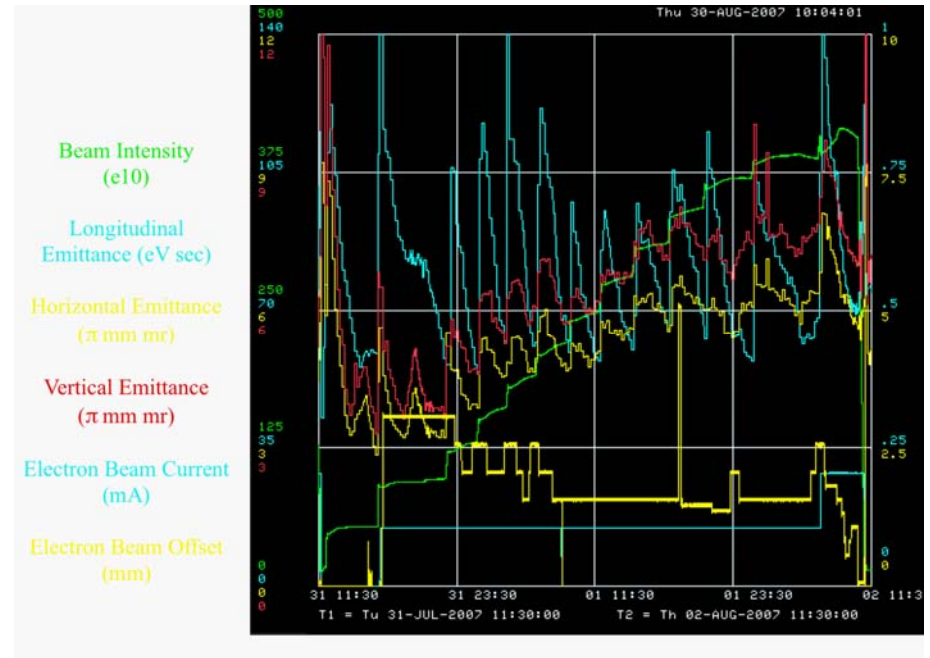
Beam intensities versus time

- Longitudinal cooling of Au in one ring operational (significant for performance)
  - Life-time at burn-off level
  - High Q cavities at a few lines needed
  - Fibre optic: signal quality an issue
- No anomalous coherent Schottky signals - mis-interpretation in the past ??
- Plans for cooling in both rings in all three phase spaces:
  - Use of microwave link (for fast signal transmission)

# FNAL: progress on cooling contributes to improved performance



- FNAL: improved performance partly due to progress on cooling
- Recycler:
  - initial intention: store “used” p-bars from Tevatron
  - now: p-bar accumulator improved stacking rate
  - Stochastic cooling
  - “high” energy electron cooling in operation (reduced life-time)
- Improvements in accumulator
- Talk on electron lens!!





# FAIR and ELENA (& AD status)



## ■ FAIR

- Many inter-connected rings
- Stochastic cooling at several rings: attempt to have optimized lattices (isochroneous from pick-up to kicker)
- Electron cooling: from medium energy (similar to FNAL) to very low energy in electrostatic ring
- Very confusing - barely impossible to keep an overview

## ■ ELENA & AD status:

- Proposal for a post-decelerator at the CERN-AD
- Motivation:
  - AD decelerates p-bars from  $\sim 3.5\text{GeV}$  to  $5\text{MeV}$  (magnetic field decreases by factor  $\sim 35$ )
  - For capture of the AD beam in traps: further deceleration by RFQ and foils -> scattering, blow-up and low capture efficiency
  - Further deceleration and electron cooling by a small ring down to  $100\text{keV}$  to gain two orders of magnitude in efficiency