

Highlights PEP-II MAC & Factories'03

- **IP tuning & optics problem** for PEP-II, MIA
- Ohmi's quasi-strong simulation – beam-beam limit is **incoherent effect**
- DAFNE upgrade plan – **strong rf focusing**
- **Feedback development** for PEP-II (0.5 ns, can damp head-tail mode $m=1$)
- **Quadrupole CB instability** predicted with low threshold (1.4 A)
- PEP-II and KEKB **upgrade plans** & concepts (higher current, shorter bunches, rf, lower betay), NLC teams help
- SLAC NEG SEY measurement less positive

John Seeman

Future very high luminosity options for PEP-II

lessons: asymmetric beam energies work, bb tune shifts 0.08-0.1

4 times more bunches, bunch current up 2-3 times, tune shift 50% up (continuous injection), betay down factor 2-3 to 1.5-3 mm

bunch-by-bunch feedback sub-ns scale by J. Fox

reduce energy asymmetry to save wall power

FY2008: 4.5 A e+, 2 A e-, beta-star 6 mm, every 2nd bucket, but particle physicists like **1e36**

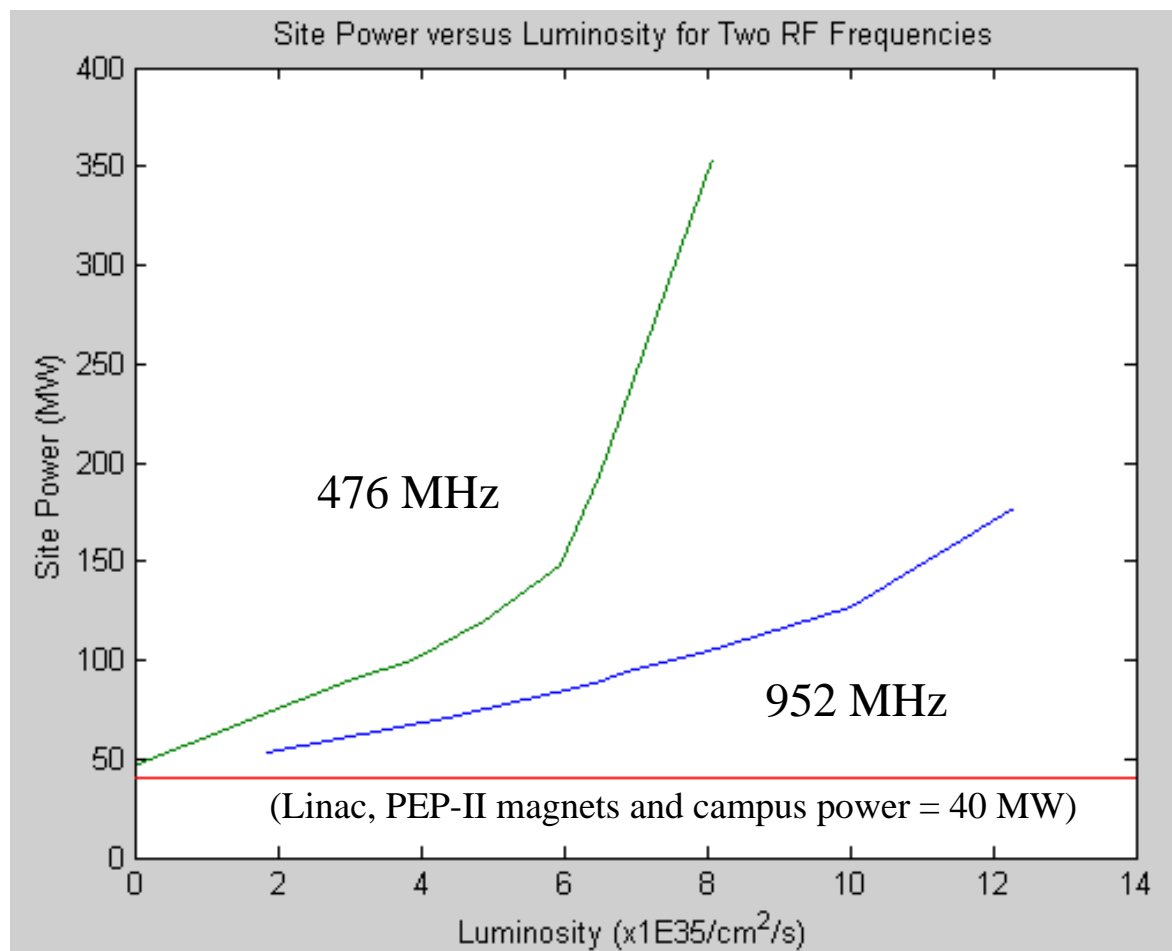
9->8 GeV 4.8 Amps in HER, LER 3->3.5 GeV, **new vacuum chamber for LER** needs LER 11 A, add magnets to soften losses, increase magnet bore, **3400 bunches**, betay-star 2.2 mm, bb parameter 0.15

site power 120 MW, L=5e35

advanced option, **new rf frequency, more bunches, 952 MHz say**, 1.8 mm bunch length, 15 mrad crossing angle, 6900 bunches, betay-star=1.5 mm **1e36 for 120 MW**

site power vs. luminosity plot, curves for different frequencies, 952 MHz better (Rice KEK-SLAC workshop, Oahu, Hawaii, January 19-22, 2004)

Site Power including Linac and Campus for Two Different RF Frequencies for the Super-B-Factory



Future BF activities

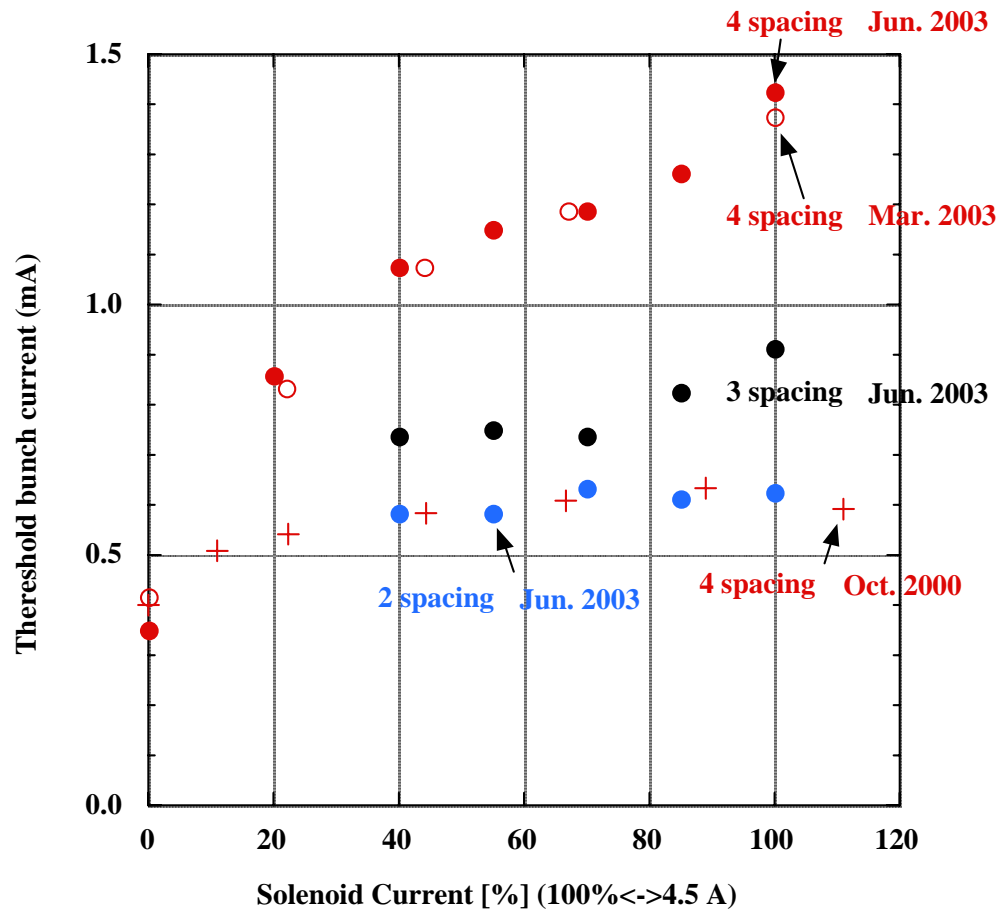
- Planned workshops:
 - October 13-16, 2003 at SLAC: ICFA Workshop on e+e- High Luminosity Colliders.
 - Super-B 10^{36} Particle Physics Workshop at SLAC October 22-24.
 - Joint KEK/SLAC Super-B-Factory workshop in January 19-22, 2004 in Oahu, Hawaii.
 - www.phys.hawaii.edu/~superb04

Highlights PEP-II MAC & Factories'03 – Cont'd

- **Head-on vs crossing angle**
- Electron cloud in KEKB, H. Fukuma (30% of electrons persist in time shift, **with 2 spacing early saturation of solenoid effect**, low luminosity)
- A. Novokhatsky, **multibunch longitudinal CB instability** driven by e-, resonant dependence on solenoid
- IR quadrupole motion in PEP-II (A. Seryi)
- **Raimondi-Seryi FF** for PEP-II Upgrade
- **Round beams** in Novosibirsk
- Strong-strong code comparisons (Ohmi, Cai, Qiang, Kabel, Rogers)

A) Field strength of solenoid vs. blowup or tune shift

a) Threshold current of the blowup

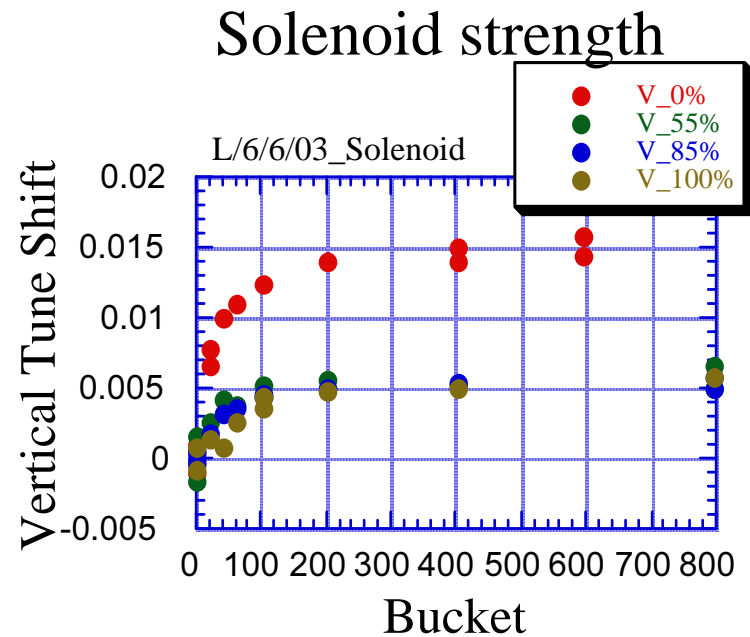
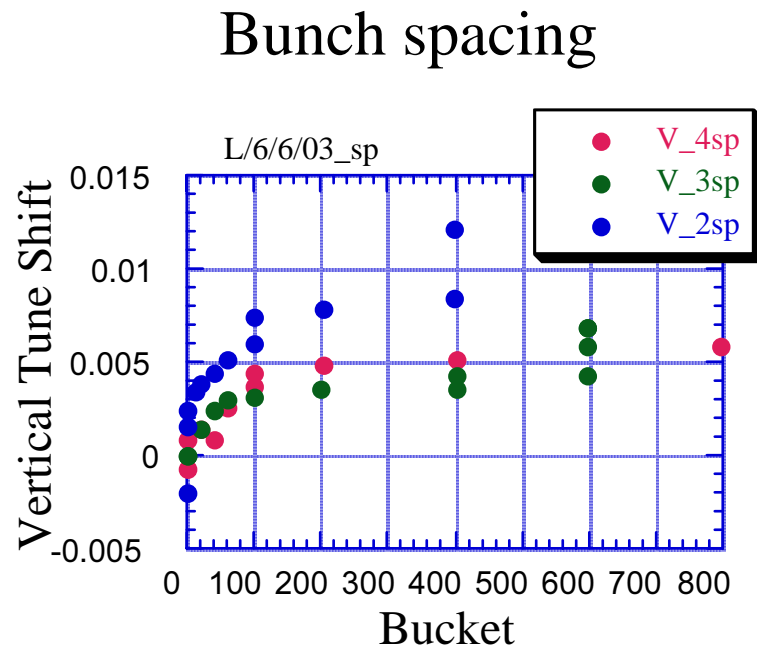


1) 3 and 4 bucket spacing : the threshold increases when the field strength increases.

2 spacing : the threshold saturates.

2) Assuming a present solenoid system, stronger field will be helpful in raising the threshold if bunch spacing is larger than/equal to 3 buckets.

tune shift probes average electron density



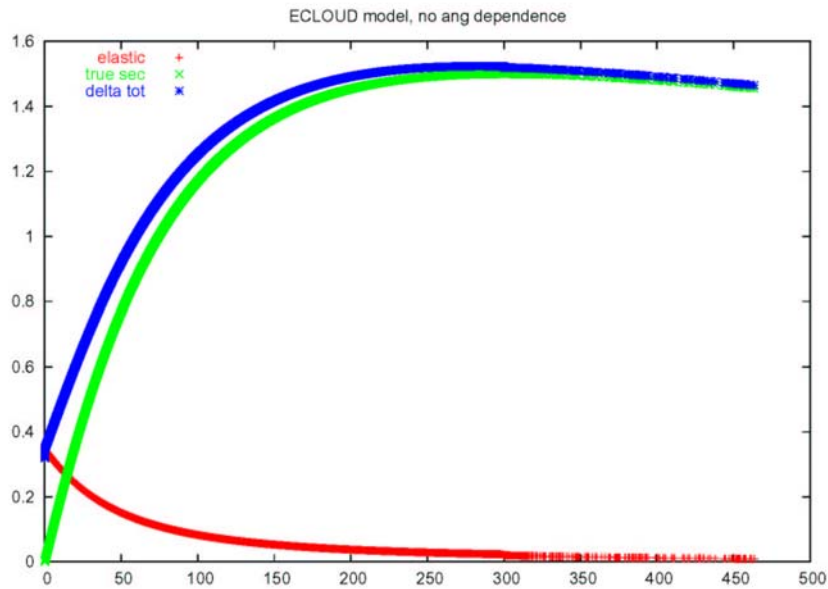
where are the remaining electrons?

Table of Strong-Strong Beam-Beam Codes

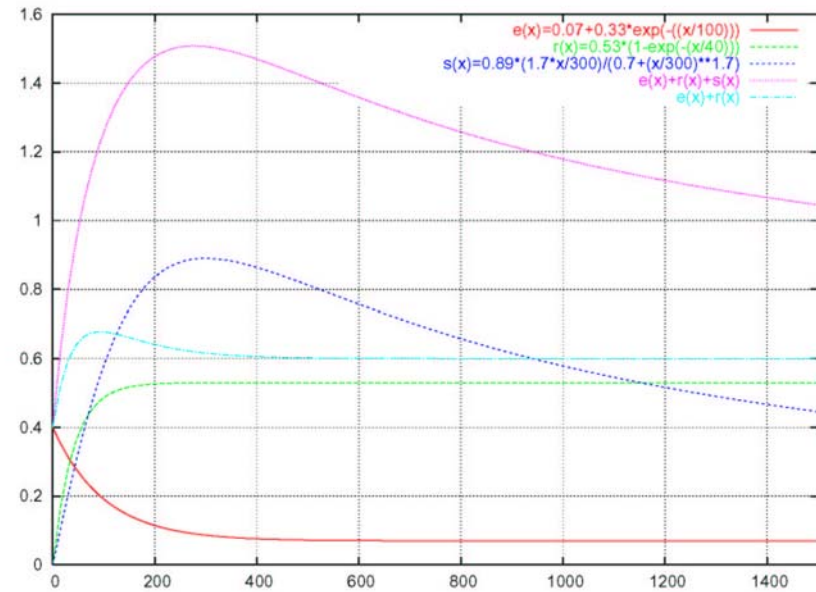
Author	Institute	Name	Angle	Paras.	Optics errors	SR	Bench - mark w code	Bench- mark w collider
A. Kabel	SLAC	nameless	No	Soon	No	yes	Cai	?
J. Qiang	LBNL	BEAMB EAM3D	Yes	Yes	Yes	yes	Cai, Ohmi	RHIC Tevatron
K. Ohmi	KEK	BBSR	Yes	No	Yes	Yes	Cai, Qiang	KEKB, PEP-II
Y. Cai	SLAC	nameless	Yes	No	Yes	Yes	Ohmi, Kabel	PEP-II, KEKB
J. Rogers	Cornell	Odysseus	Yes	Yes	Yes	Yes	No	CESR
J. Shi	Kansas	?	?	Yes	Yes	?	?	(LHC)
W. Herr, F. Jones	CERN/ TRIUMF	BeamX	Yes	Yes	Partly	No	No	(LHC)

Recent Studies by Giulia Bellodi (RAL)

different SEY models & impact on simulations



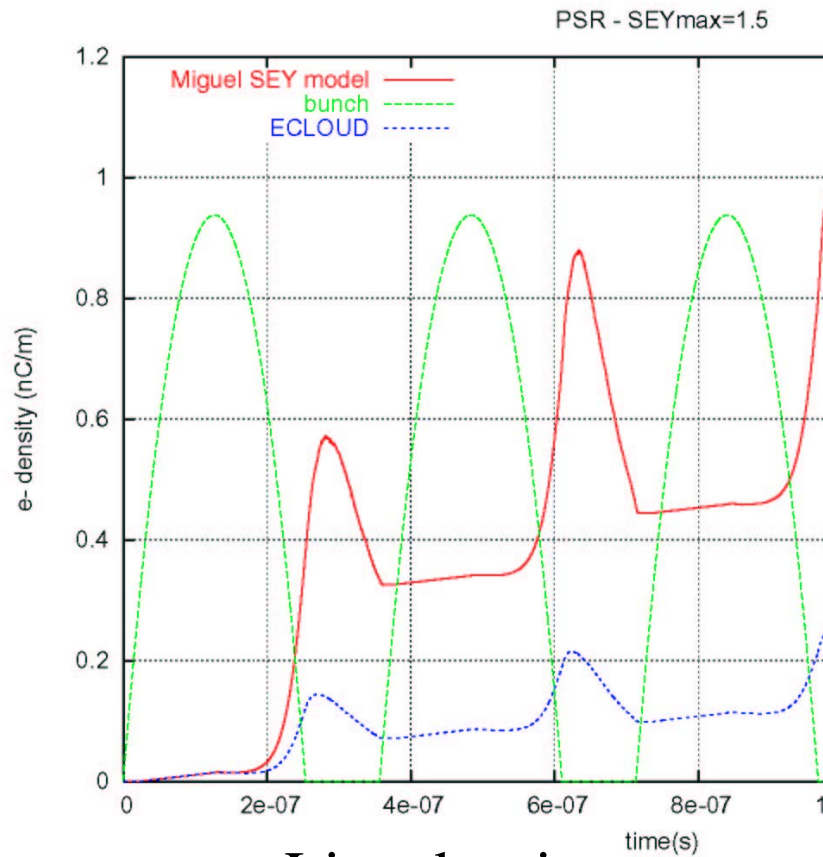
ECLLOUD



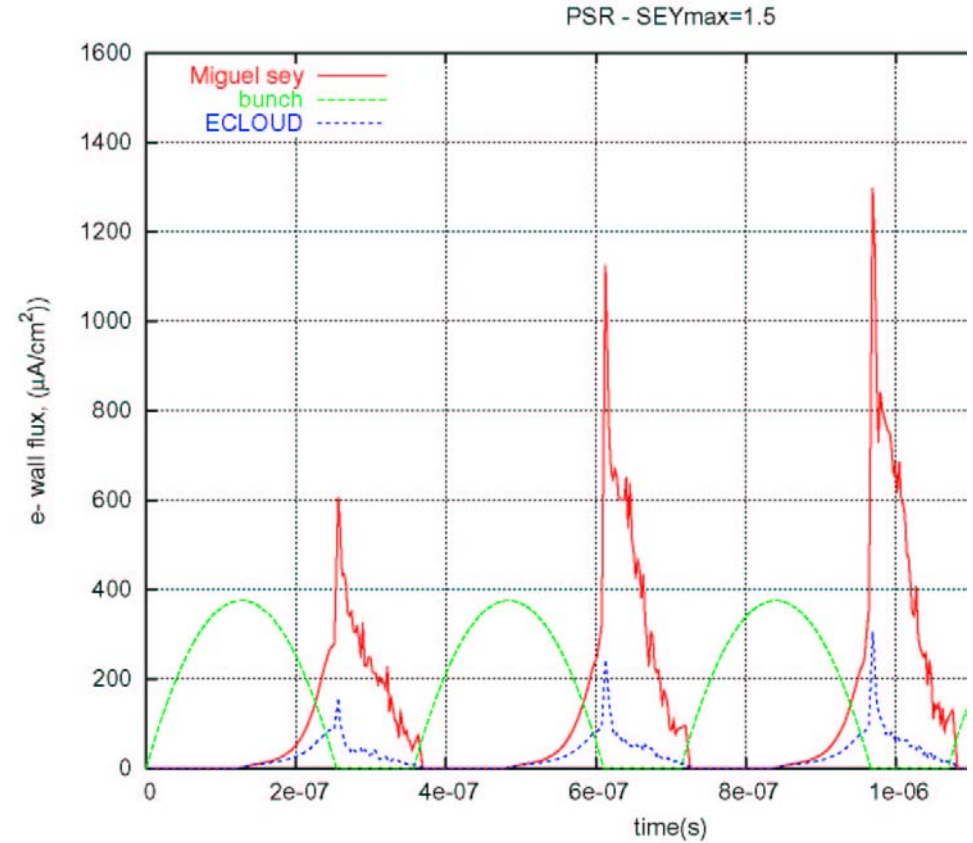
POSINST

Comparison by G. Bellodi

Comparison by G. Bellodi



Line density



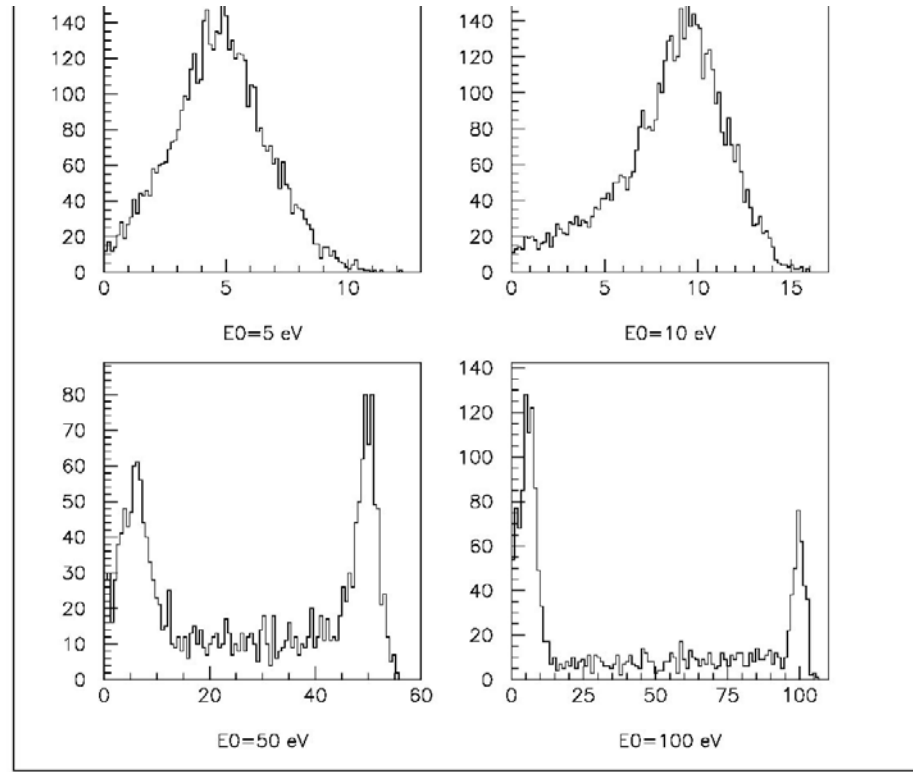
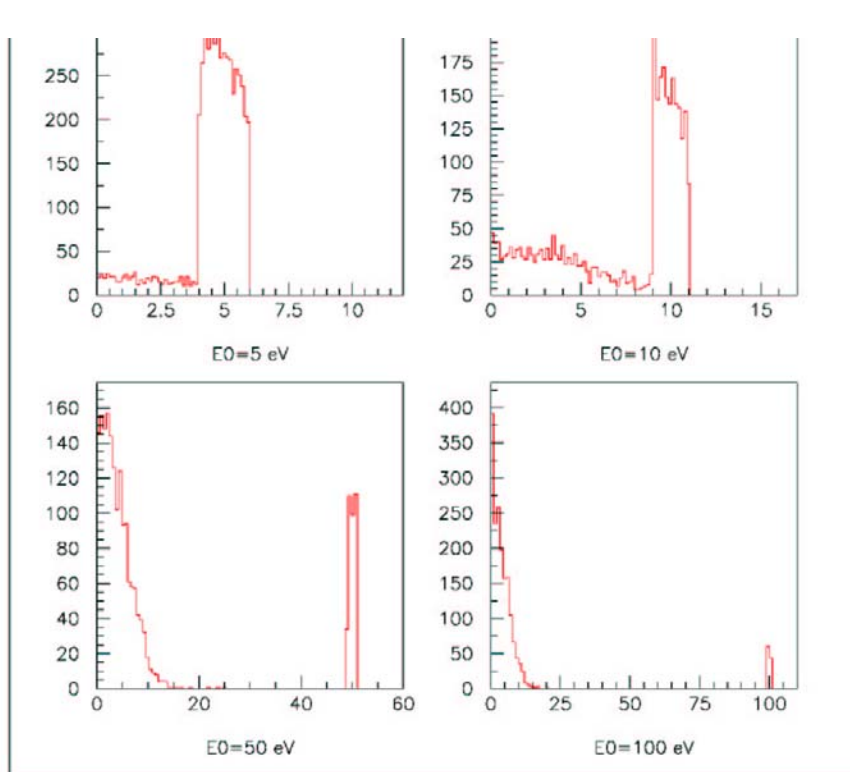
Flux on the wall

PSR simulation – ECLLOUD model vs POSINST model

secondary e- energy distribution

ECLOUD model

POSINST model



ECLOUD'04 Workshop

E-CLOUD'04



31st ICFA Advanced Beam Dynamics Workshop on Electron-Cloud Effects "E-CLOUD'04" Napa (California), April 19-22, 2004



Sponsored by LBNL, CERN, ORNL, SNS and ICFA

<http://www.cern.ch/icfa-ecloud04>

Workshop Committees

Place, Deadlines and Proceedings

The E-CLOUD'04 workshop will take place in the Napa Embassy Suites (<http://www.embassynapa.com/>), which will also be the official conference hotel. The deadline for **abstract submission** is **January 30, 2004**. The deadline for **hotel reservations** is **March 18, 2004**. Proceedings will be published, and authors will be encouraged to submit their contributions to a special edition of PRST-AB (details

on abstract submission, registration, hotel reservations and transportation options to follow).

1st Announcement and Scope ([pdf file](#))

The existence of electron cloud effects (ECEs), which include vacuum pressure rise, emittance growth, instabilities, heat load on cryogenic walls and interference with certain beam diagnostics, have been firmly established at several storage rings, including the PF, BEPC, KEK-B, PEP-II, SPS, PSR, APS and RHIC, and is a primary concern for future machines that use intense beams such as linear collider damping rings, B factory upgrades, heavy-ion fusion drivers, spallation neutron sources and the LHC.

This ICFA workshop will review experimental methods and results obtained within the past few years on the ECE, along with progress on its understanding obtained from simulations and analytic theory, and the effectiveness of mitigation mechanisms, including active damping.

As in previous workshops dealing with the ECE (MBI'97, KEK, July 1997; [Two-Stream Instabilities, Santa Fe](#), February 2000; [Two-Stream Instabilities, KEK](#), September 2001; [E-CLOUD'02, CERN](#), April 2002), the focus of E-CLOUD04 will be broad, covering all aspects of the phenomenon.

Some of the **topics** to be covered are:

- Review of observations at the SPS, PSR, and the B factories.
- Experimental methods and e-cloud diagnostics.
- Lessons learned from simulation comparisons with experiments (effect of secondary emission yield, understanding of single-bunch instabilities, etc)
- Predictions for intense proton and heavy-ion machines.
- Progress in simulation codes and the physical model involved.
- Progress in analytical models.
- Various methods of mitigating ECE (e.g. Landau damping, e-suppression coatings, beam scrubbing, clearing fields, beam manipulation, and active damping)

Some of the **goals** that will guide the workshop are:

- Summarize our understanding, identify essential issues, and scope out future research avenues.

- Assess state of theory and simulations.
- Identify and assess mitigation mechanisms.
- Compile list of simulation codes and their features.
- Assess experimental methods and diagnostics.
- Strengthen and expand international collaborations.

workshop contact: Miguel Furman (mafurman@lbl.gov)

Organizing Committee:

M. Furman mafurman@lbl.gov

J. Byrd jmbyrd@lbl.gov

W. Chou chou@fnal.gov

F. Zimmermann frank.zimmermann@cern.ch

T. Gallant tggallant@lbl.gov (admin)

J. Thomashausen juliette.thomashausen@cern.ch (admin)

web site last updated 21. October, 2003,
by [Frank Zimmermann](#)

Status of Impedance Collection

Overall not much progress

Response from Deepa, but no files for rf cavities yet

Some numbers from Wolfgang Hofle; he asked whether LCE team has resources to help with MAFIA calculations for damper

Bruno Spataro lost his files for LHC impedance calculations

Contacted Derun Li (LBNL), who promised to send MAFIA input/output files for Y chamber