

Summary Report of Session VI

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Thanks to the organizers : Frank, Giovanni, Francesco,
Julietta

Special thanks to Elias and Massimo for compiling the
"critical mass" table

Outline

Part A. Review of talks

Part B. Summary of discussions

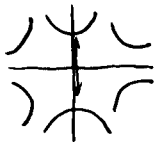
Machine	E (GeV)	N_b	σ_h (mm)	σ_v (mm)	σ_z (mm)	S_b (ns)	Full length (mm)	$\frac{N_b}{\sigma_h \sigma_v \sigma_z} (\text{mm}^{-3})$ (lab frame)	$\frac{\text{Pipe (mm)}}{S_b \text{ (ns)}}$
CPS (Matsui)	26	4×10^{10}	1.6	1.2	750	25	70	0.35 0.28	2.8
SPS (LHC op.) (Andersson)	26	3×10^{10}	2.2	2.2	300	25	43	0.21	1.7
SPS (FT op.)	100	5×10^9	2	1	190	5	43	0.13	8.6
PSR (Mack)	0.8	3×10^{13}	10	10	19500	360	100	0.15	0.28
RHIC (P) (Fischer)	25	1×10^{11}	3	3	1125	108	80	0.10	0.74
SNS (Wei)	1	2×10^{14}	15	15	30000	945	200	0.30	0.21
LHC (Zimmerman)									
ISIS (Toyama)	0.07	1.25×10^{13}	38	38	15000			0.006	
Proton Driver (Chou)	0.6	3×10^{11}	23	13	300	19	100	0.033	5.3
PEP-II (Decker)	3.1	5×10^{10}	0.7	0.1	12	8.4	55x2	600	6.5 x 2
KEK-B (Fukuma)	3.5	2.2×10^{10}	0.5	0.05	6	8	47x2	1470	5.9 x 2
APS (Harkey)	7	5×10^{10}	0.2	0.02	10	20	40	12500	2.0
DR	1.98								
ISR - FT (Lund)	< 3	4.15×10^{13}	< 19 41	< 19 11	27500 20500	580 580		0.04 (36W), 0.17 (506W)	

Part A. Review of talks

1. Irigo Ariz : RF test station for ECE.
2. Rumolo : Proposed ECE expt. at GSI.
3. Caspers : Invisible cleaning electrodes.
4. Macek's list of cures :

PSR : (a) Proved to be effective :

- scrubbing : beam intensity $\times 2 \sim 3$
- inductive inserts
- sextupoles (acting as if skew quads)



(b) Reducing prompt e^- but doesn't increase beam intensity :

- TiN coating : $e^- \times \frac{1}{200}$
- Solenoid (20 Gauss) : $e^- \times \frac{1}{50}$
- better vacuum : $e^- \propto$ pressure

KEK-B
PEP-II

} Proved to be effective :

- TiN coating
- solenoid

SPS : Proved to be effective :

- larger bunch spacing

5. Ruggiero's list of future work

6. Paravedentsev : Beam-beam + transverse impedance

Part B. Summary of discussions

1. "Critical mass" table :

- (a) All proton machines that have observed ECE have a volume density $\sim 0.2 \pm 0.1 \times 10^{20}/\text{m}^3$
- (b) All e^+ machines that have observed ECE have a volume density $> 2,000$ times higher than (a).

To add new rows for :

- ISR
- JHF
- DAFNE

To add new columns for :

- space charge
- plasma frequency
- Heifetz's 2 papers

2. Comments on primary e^- :

(a) Sources of primary e^- :

- proton machines / proton loss
 \ stripping foil
- e^+ machines: photo emission.
- ionization (vacuum) not important

(b) Reducing primary e^- doesn't help.

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6. Code benchmarking:

E-cloud build-up

LBL (Furman)

CERN (Zimmermann)

KEK (Ohmi-Wang)

LANL (T. Wang)

Instabilities

CERN (Rumolo)

KEK (Ohmi-Wang)

SLAC/LBL (Cai)

BNL (Blaskiewicz)

USC (Katsouleas)

PPPL (Qin)

LANL (T. Wang)

Coordinator — Frank Zimmermann!