



Joint CARE-HHH-APD, CARE-ELAN and EUROTeV-WP3
mini-Workshop on Electron Cloud Clearing

Electron Cloud Effects and Technological Consequences

motivation & theme

- e-cloud observed at SPS and PS
- concern for: LHC, LHC+, PS2, SPS with PS2, CLIC & ILC
- best approach: avoid e-cloud build up
- technological solutions:
 - NEG coating (SPS tests, LHC warm sections, RHIC)
 - grooves (SLAC, PEP-II, ILC)
 - “conventional” clearing electrodes (DAFNE, AA, EPA)
 - e-cloud killer no. 1 (Peter McIntyre, NEG coated copper sheet clearing electrode with microscope glass insulation)
 - the new “e-cloud killer” (Fritz Caspers, clearing electrode based on double layer of enamel coating)
 - slotted surface shielding beam fields (Warner Bruns)

comparison of solutions

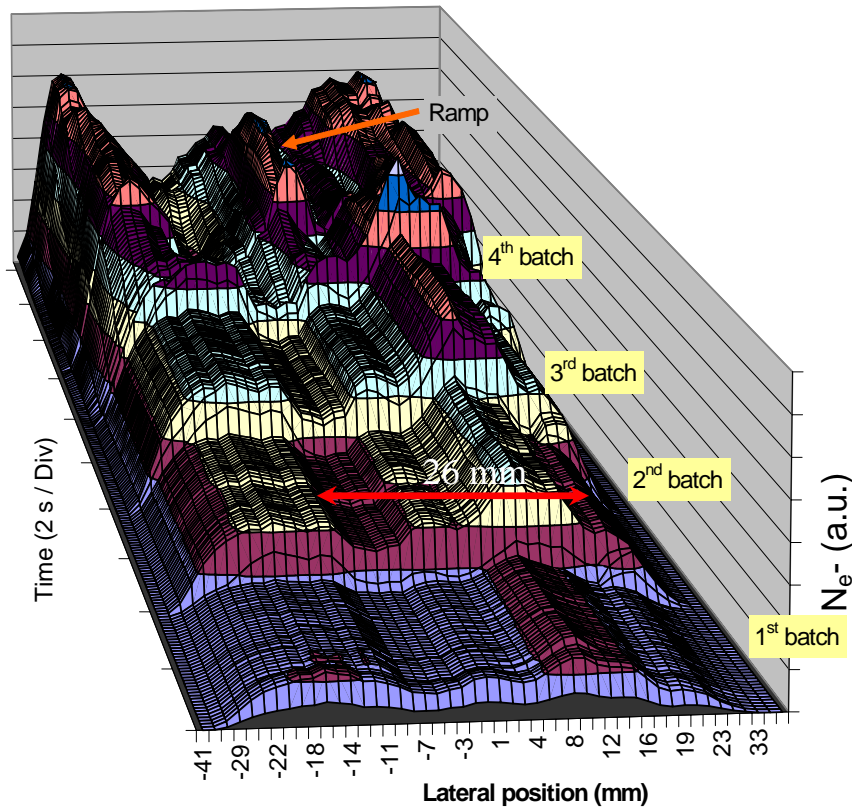
- modeling
- prototypes
- beam experiments
- suppression efficiency
- impedance
- vacuum issues
- implications & cost

some examples

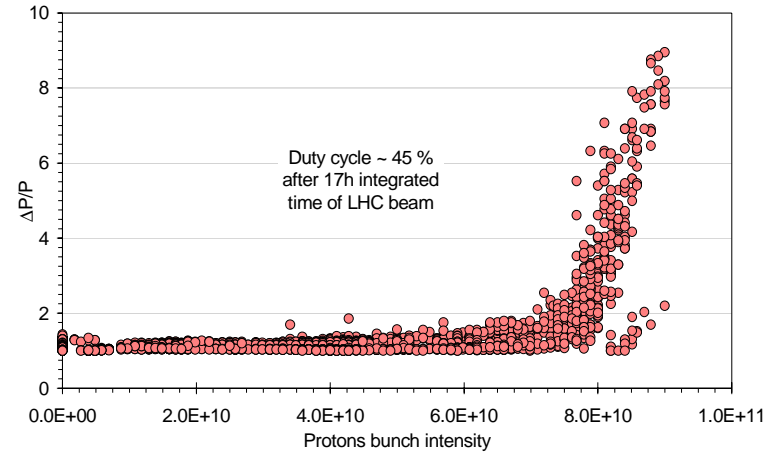
e- cloud at SPS

(M. Jimenez et al)

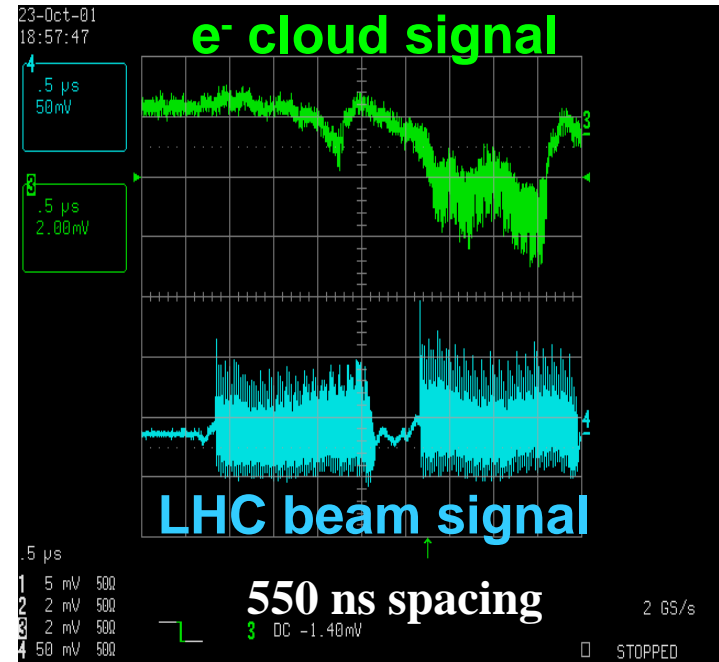
strip detector in
dipole field



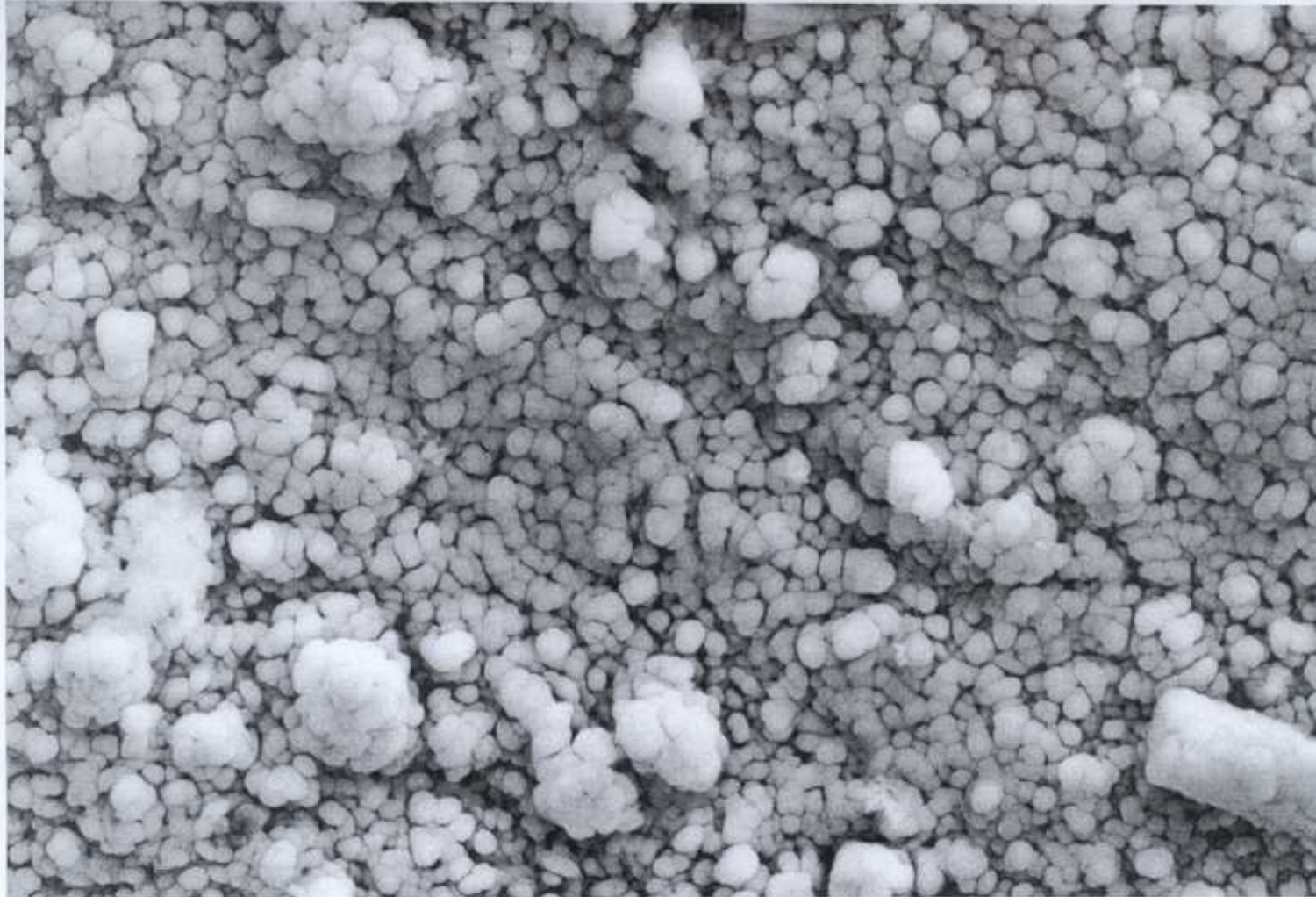
pressure rise



shielded pick up



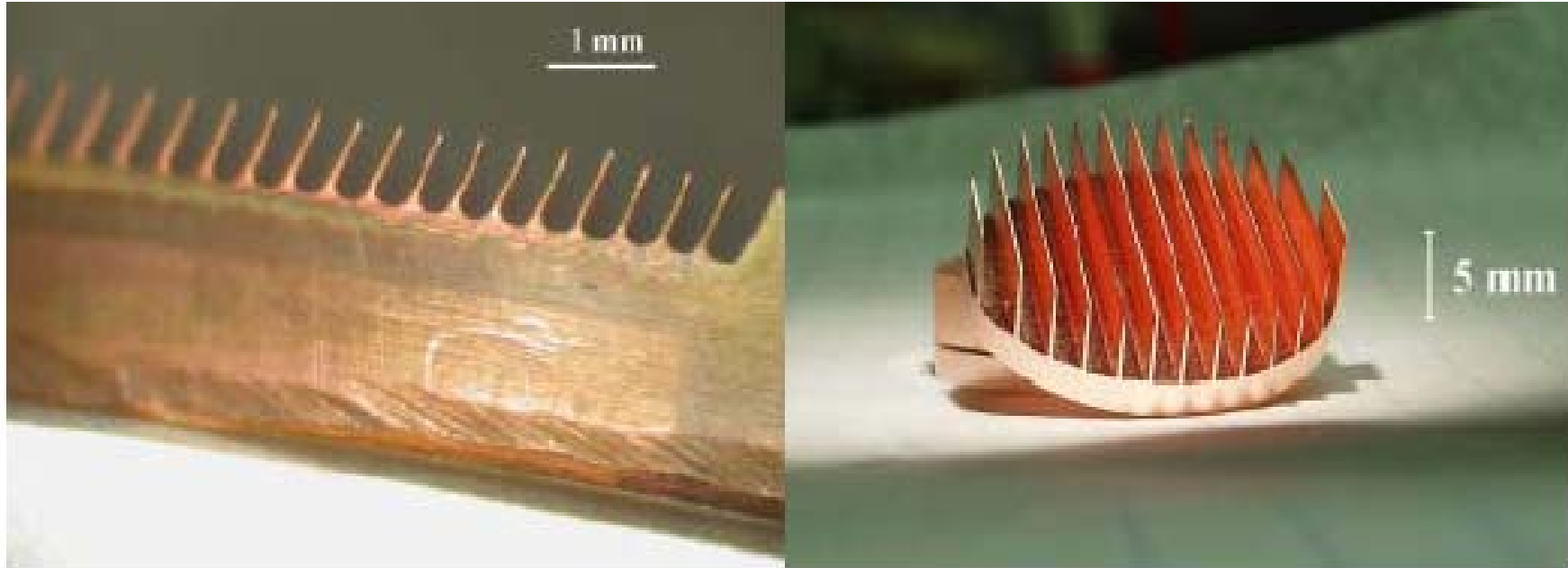
NEG coating



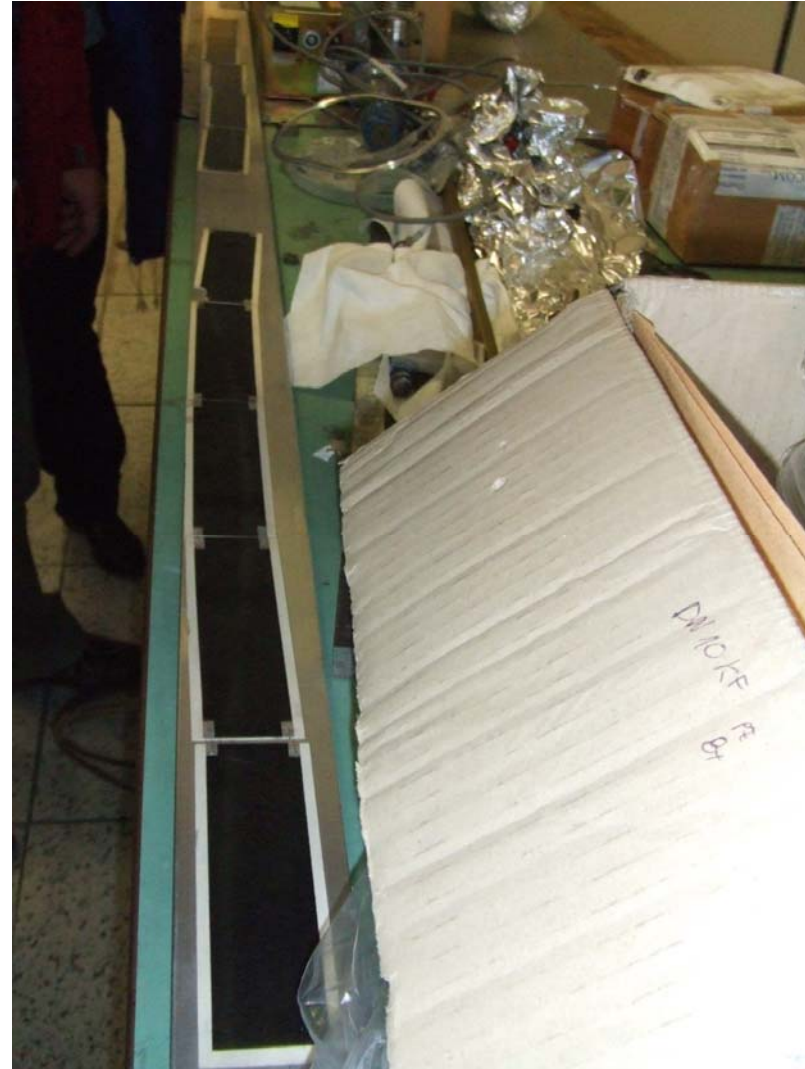
NEG
on Al/
surface

LEO 1530 Mag = 9.01 K X EHT = 20.00 kV Signal A = SE2 Date :23 Mar 2004 Gun Vacuum = 8.30e-010 Torr
Serial No. = LEO 1530-21-90 1µm WD = 9 mm Output To = Default Printer Time :11:42:18 Noise Reduction = Line Int, Done

grooves (M. Pivi et al, SLAC)



conventional clearing electrode (DAFNE)
- now removed from the ring



e- cloud killer prototyped by Texas A&M

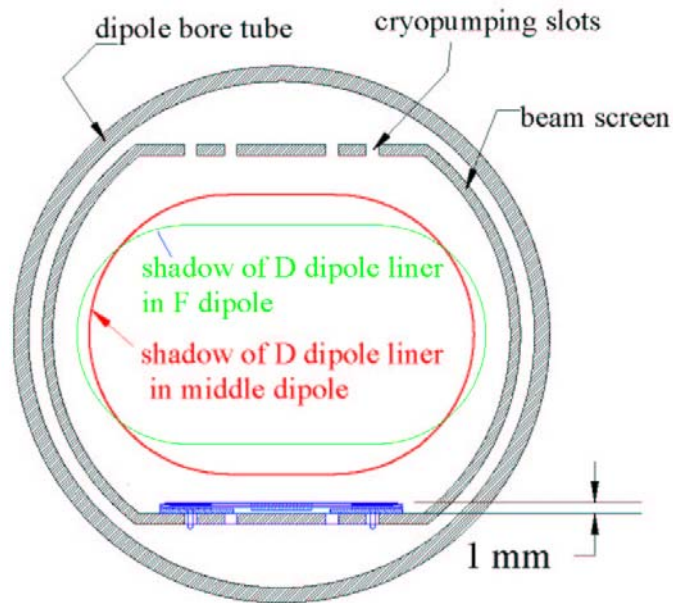


Figure 1. ECE electrode assembly (blue) on base of beam screen. Shadows of the beam screen from the D dipole are shown at the F dipole (green) and middle dipole (red).

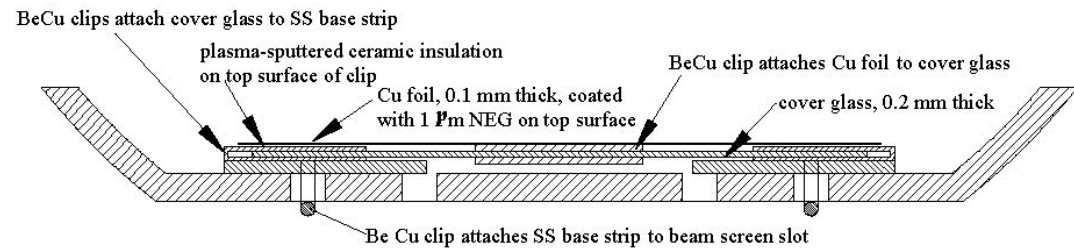


Figure 2. Detail of ECE electrode assembly.

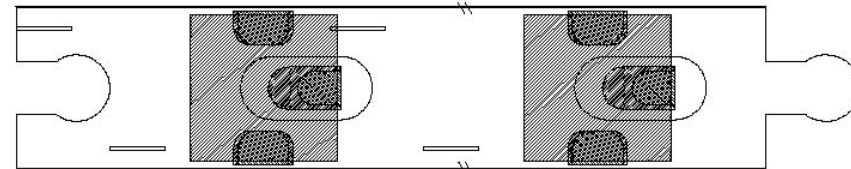


Figure 3. Plan view of a segment of the ECE electrode, showing attachment of Cu electrode to SS skid.

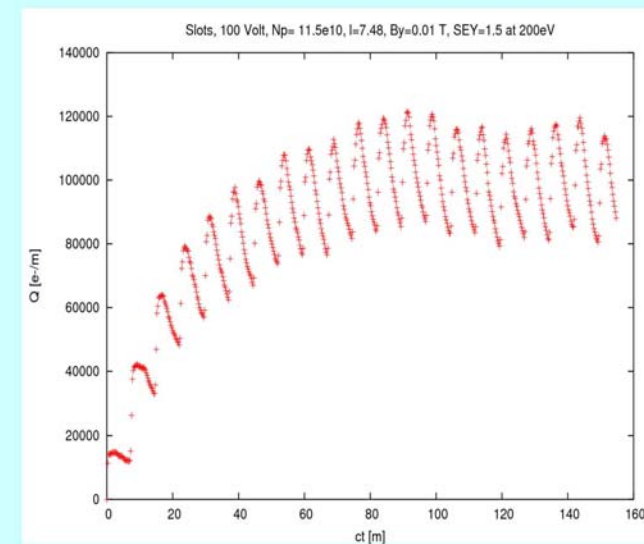
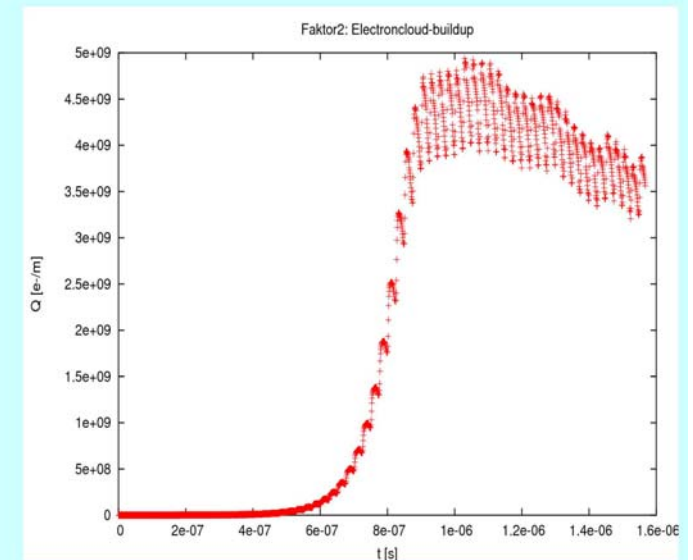
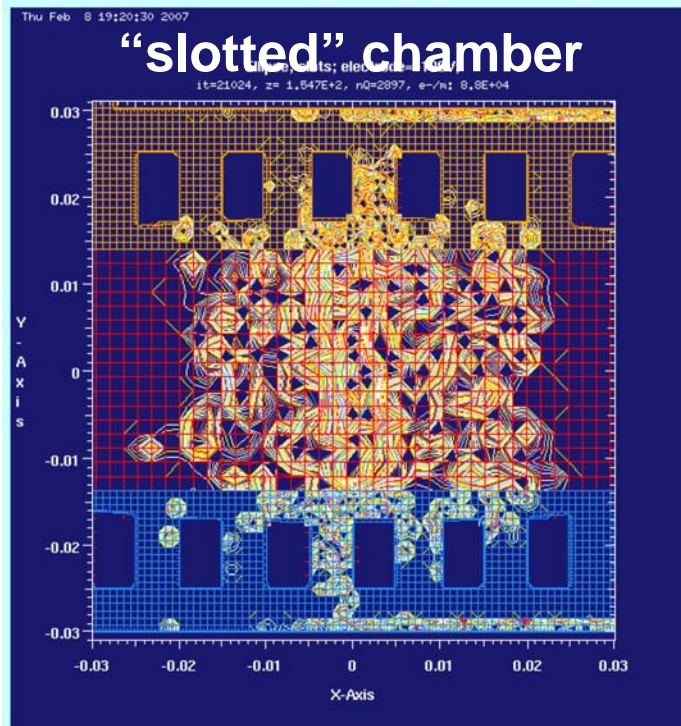
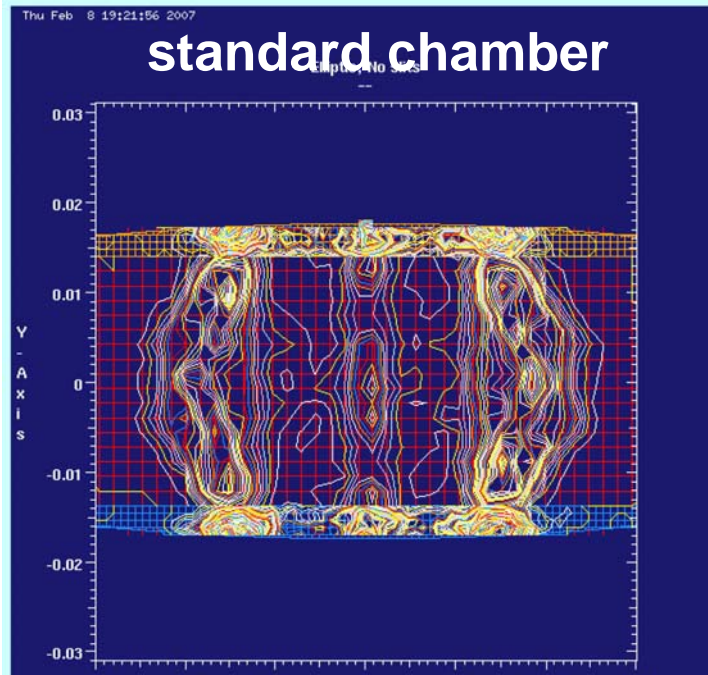
NEG-coated 100- μ m copper-foil electrode with 100-V bias voltage

double enamel coating – the new e- cloud killer
(F. Caspers, F.-J. Behler, P. Hellmold, J. Wendel)



ECL'2 Welcome – Steve Myers

“slotted”
surface



W. Bruns



*welcome to CERN &
good luck for achieving ECL2 goals!*