Recent PS e-cloud Measurementsa First Look
&
PS e-Cloud Simulations

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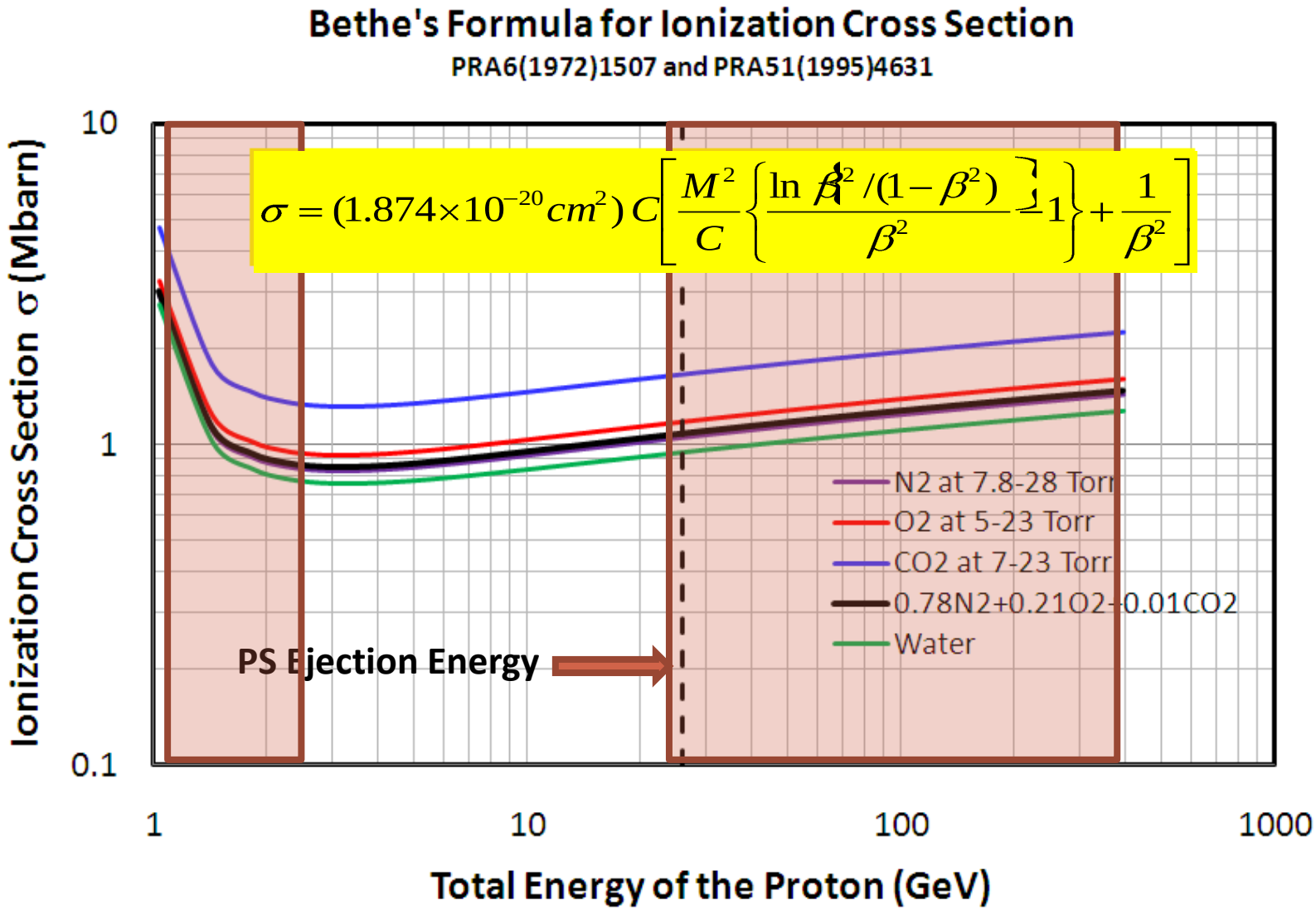
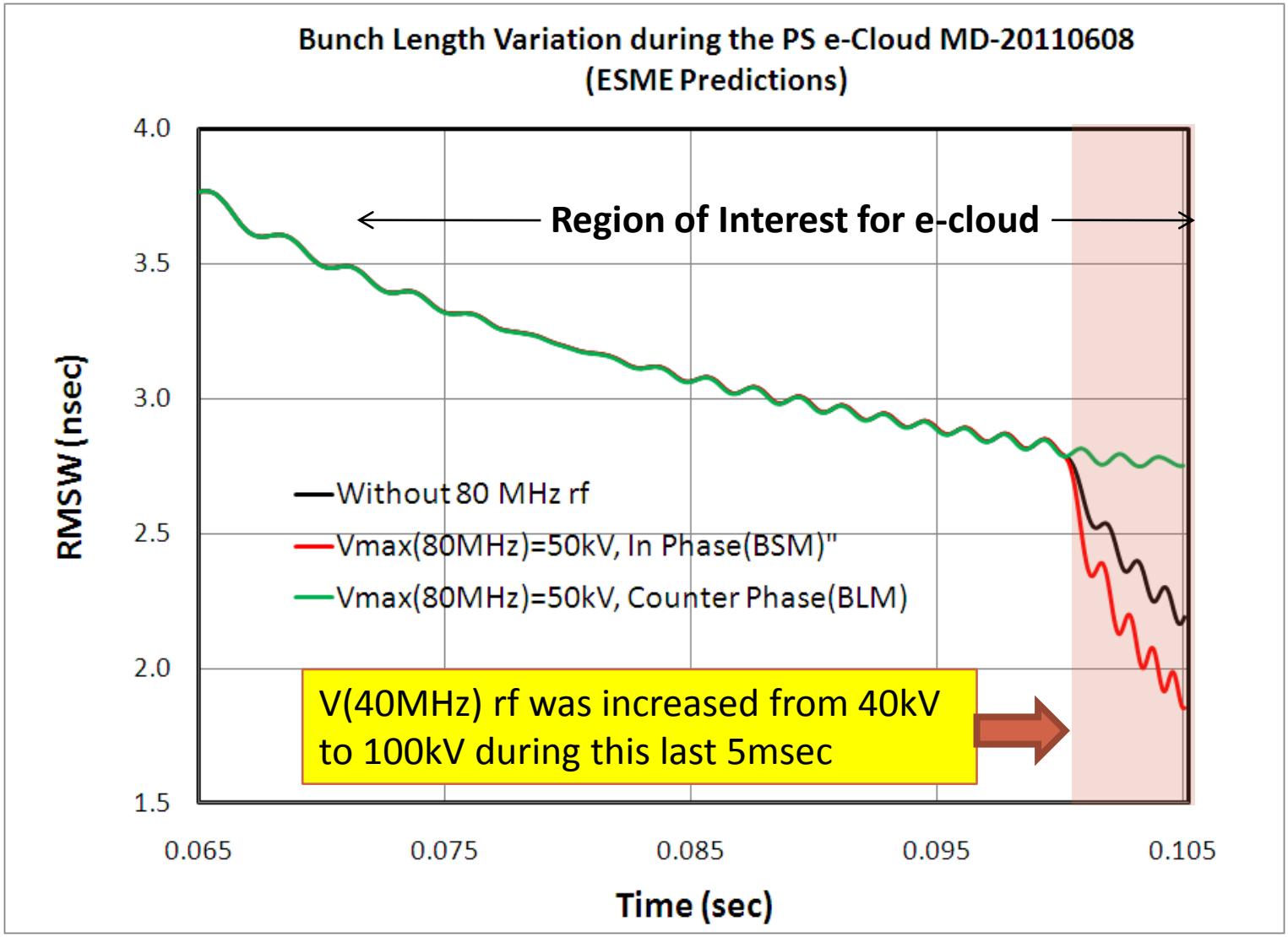
F. Caspers and F. Zimmermann
and Theodoros Argyropoulos

e-cloud simulation meeting
June 16, 2011

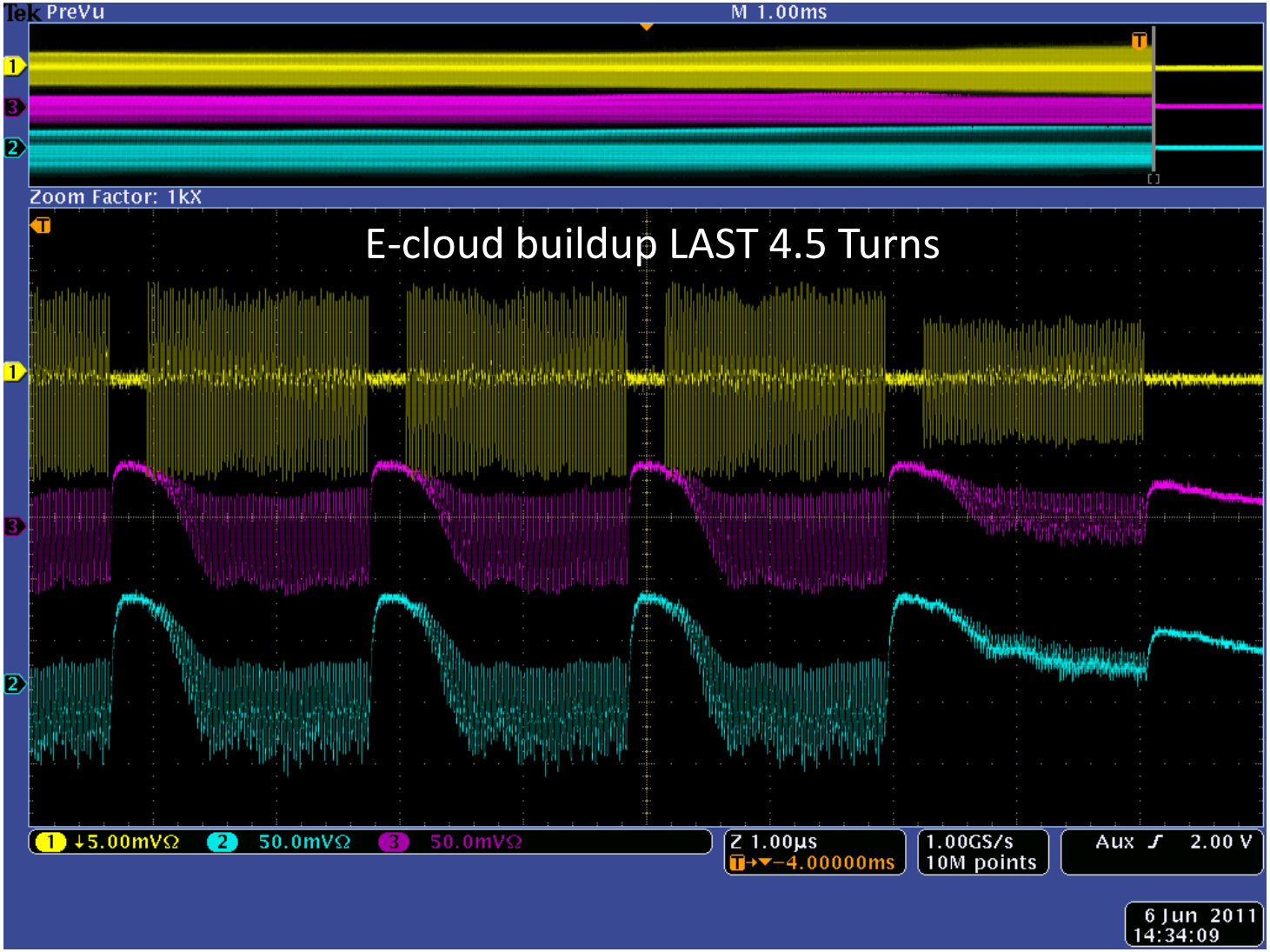
Ionization Cross Section σ



ESME Simulations



E-Cloud Measurements in the PS (20110606) Without 80 MHz RF



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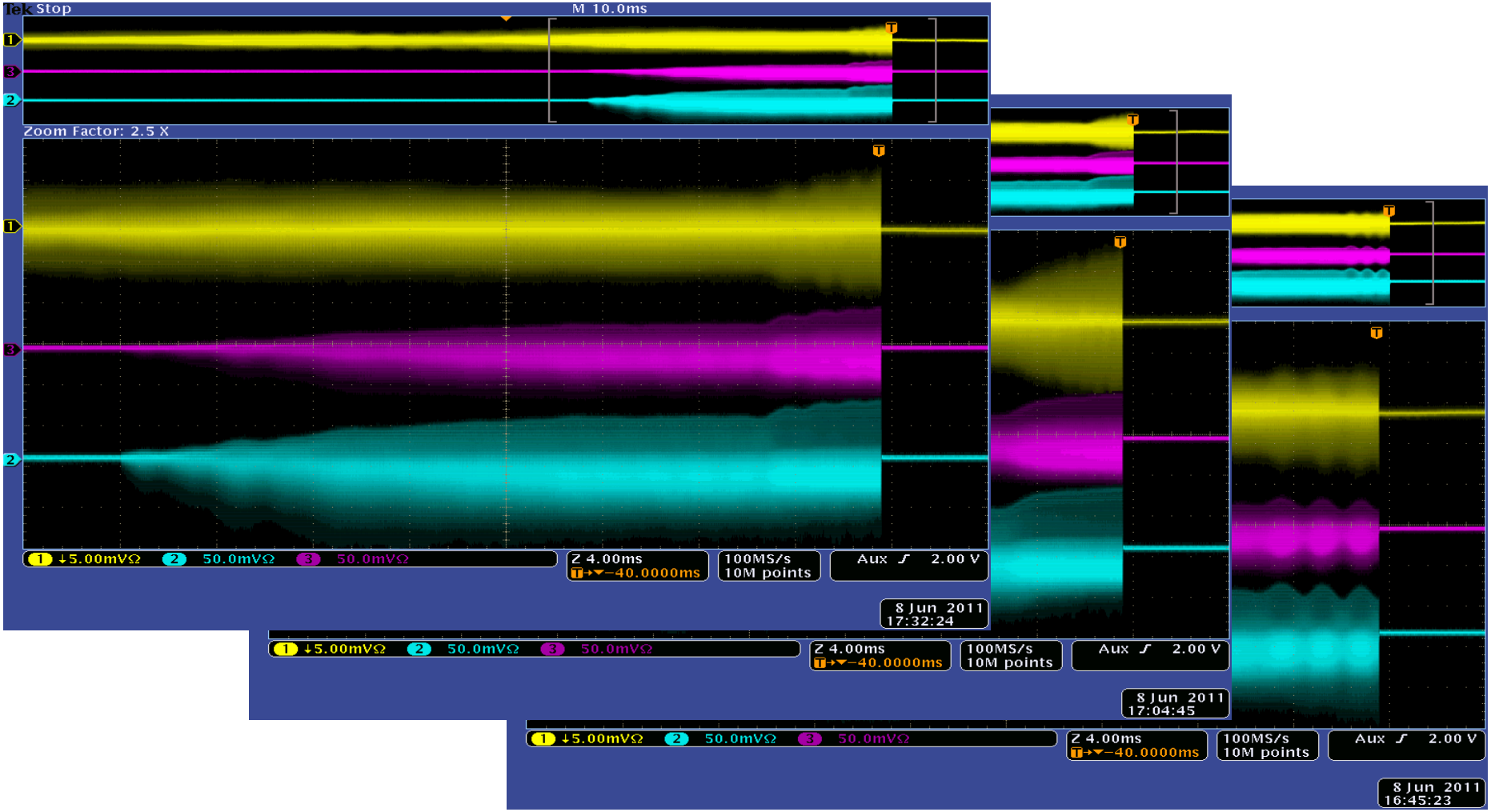
E-Cloud Measurements in the PS
20110606-20110610



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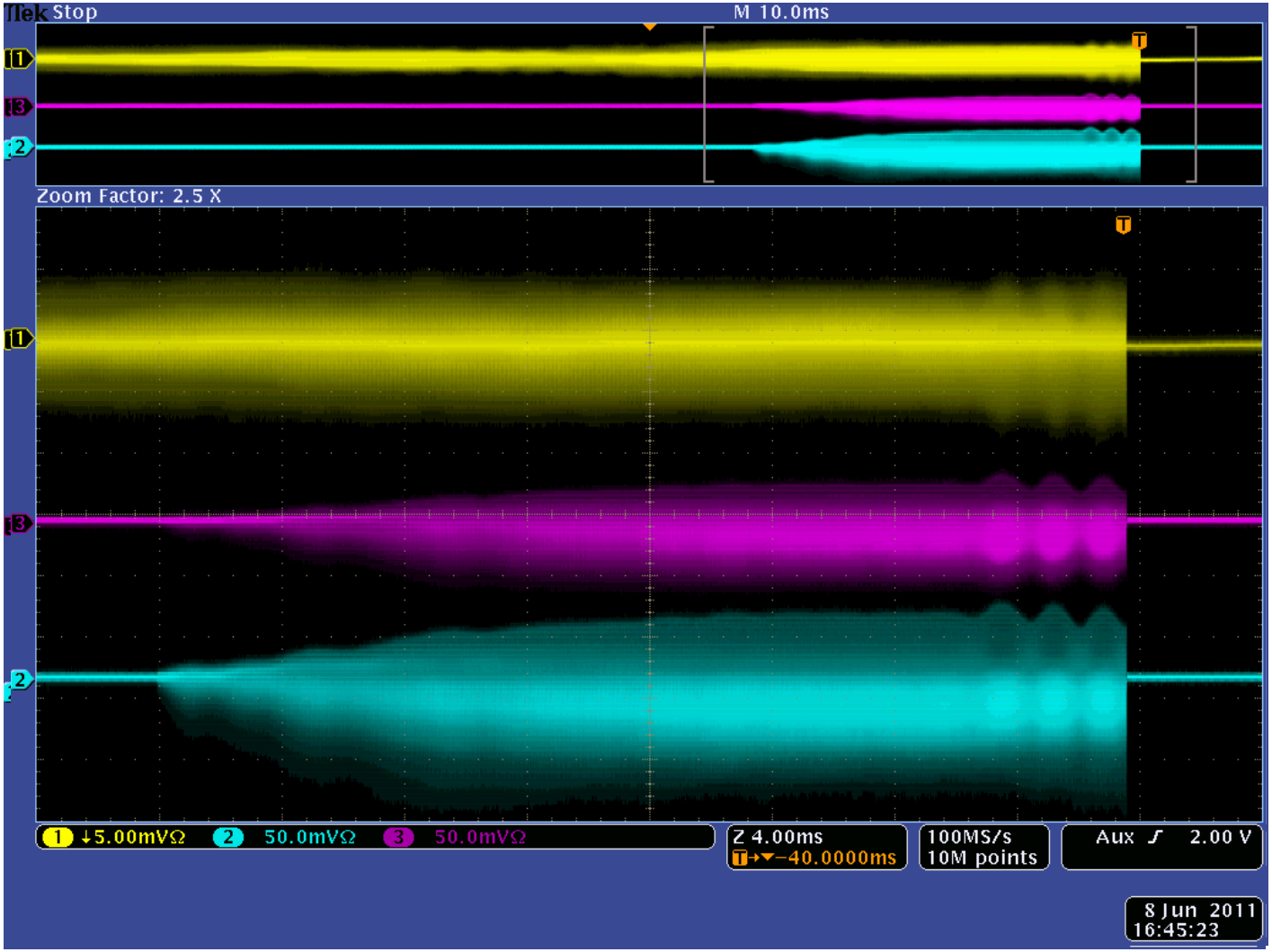
E-Cloud Measurements in the PS 20110606-20110610



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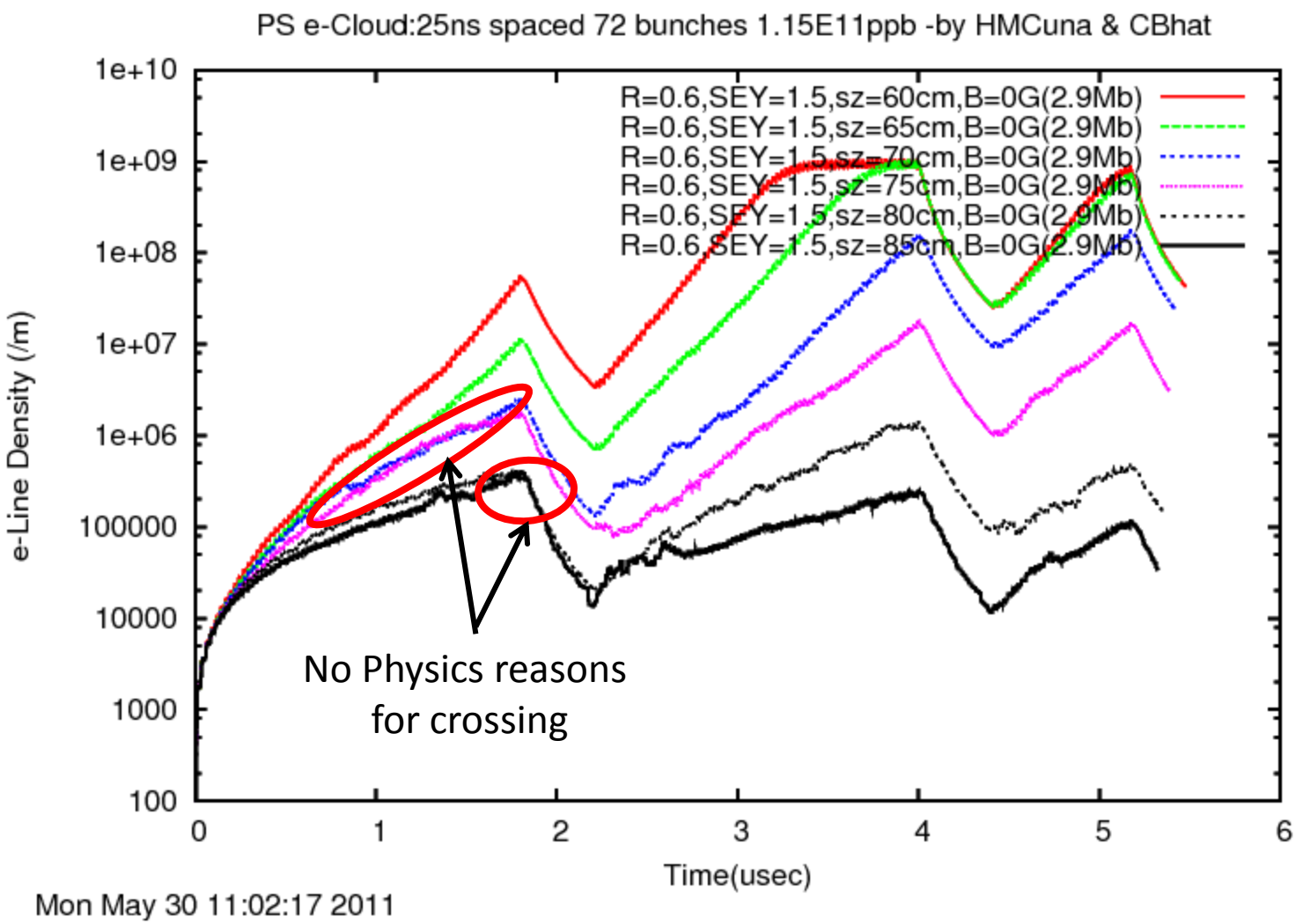
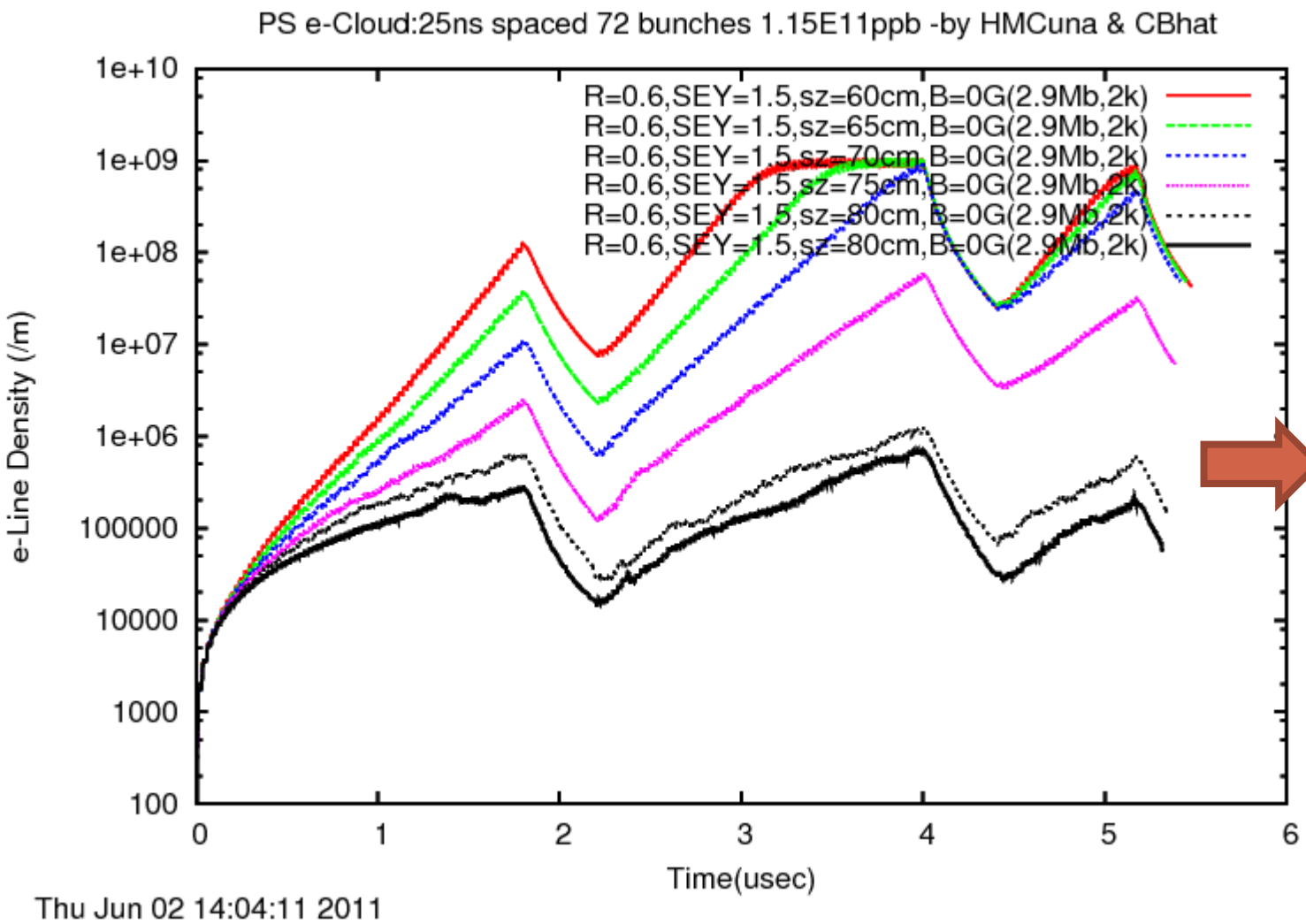
Work in Progress:

PS e-Cloud: σ_{ion}=2.9 MBarn, SEY=1.5, R=0.6, BF=0G, sz=60-85cm, Gaussian bunch(500 macro particles)



Work in Progress:

PS e-Cloud: σ_{ion}=2.9 MBarn, SEY=1.5, R=0.6, BF=0G, sz=60-85cm, Gaussian bunch(2000 macro particles)



No crossing;
The previous simulations did **not have enough statistics**

→ One may have to revisit previous simulations done for the LHC e-cloud- make sure that there were not statistical effect.

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Work in Progress

PS- e-Cloud Simulation

- We have studied
  - Seed dependence ← no strong dependence is seen
  - # of macro-particles ← strong dependence is seen, suggests **>2000** macro-particles in our case
  - σ_{Ion}: 2.9, **2.0**, 1.0 Mbarn
  - SEY=1.0 to 1.6 (**1.5**) and R=0.3-1.0 (**0.6**)
  - Bunch Length (1σ)=60cm-175cm

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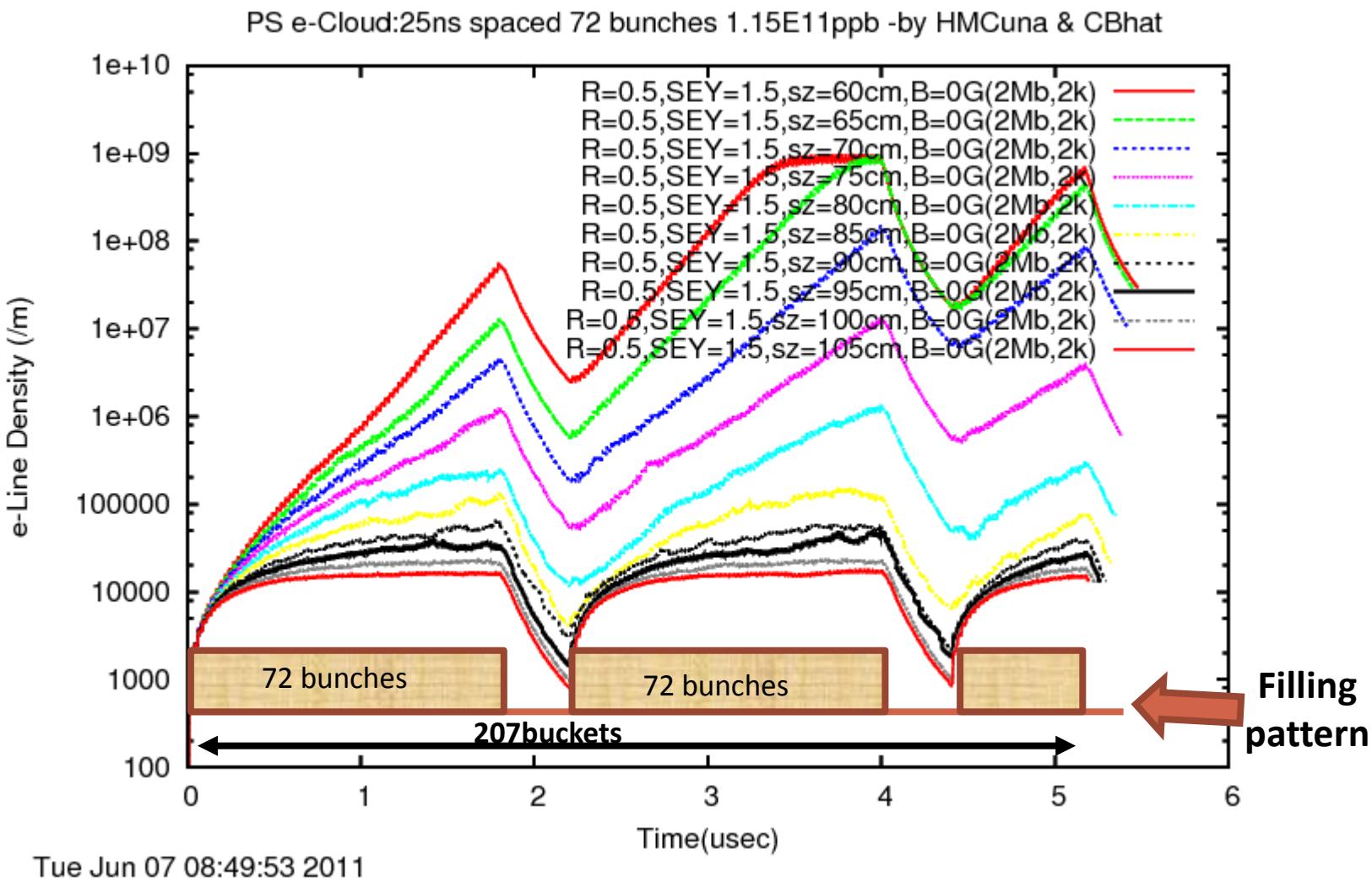
Work in Progress:

PS e-Cloud: σ_{ion}=2 MBarn, SEY=1.5, R=0.5, BF=0G, sz=60-105cm, Gaussian bunch(2000 macro-particles)



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Summary/Conclusions

- An experiment is proposed/being conducted in the PS to study the e-cloud effects to study the e-cloud density as a function of
  - Bunch profile, Bunch spacing and Bunch intensity

  For the LHC type beam
- ECLOUD Simulations are being conducted to reproduce the observed e-cloud buildup in the PS
- Systematic approach is adopted to establish
  - Minimized statistical effects
  - Good set of physical parameters for the simulation