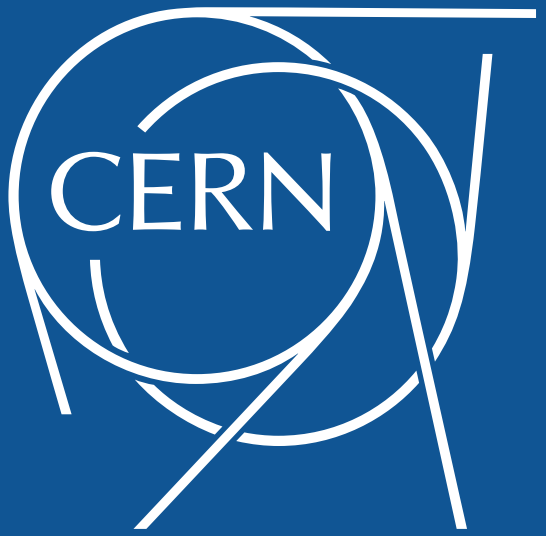
CERN

Simulation studies of the bunch length dependence on e-cloud build-up in circular drift tubes

Eric Wulff

Outline

- Goal
- e-cloud simulation setup
- SEY threshold
- Heat load and current vs bunch length
- Summary

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Goal

- To study the dependence of bunch length on the heat load and current deposited on a circular drift tube of radius 40 mm

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e-cloud simulation setup

- 450 GeV beam energy
- 1.1 $\times 10^{11}$ p/bunch beam intensity
- Standard 25 ns beam
- No magnetic field
- Uniform initial electron density
- SEY scan: 1.0 - 1.8
- Bunch length scan: 0.7 - 1.8 ns
- Circular chamber with radius of 40mm

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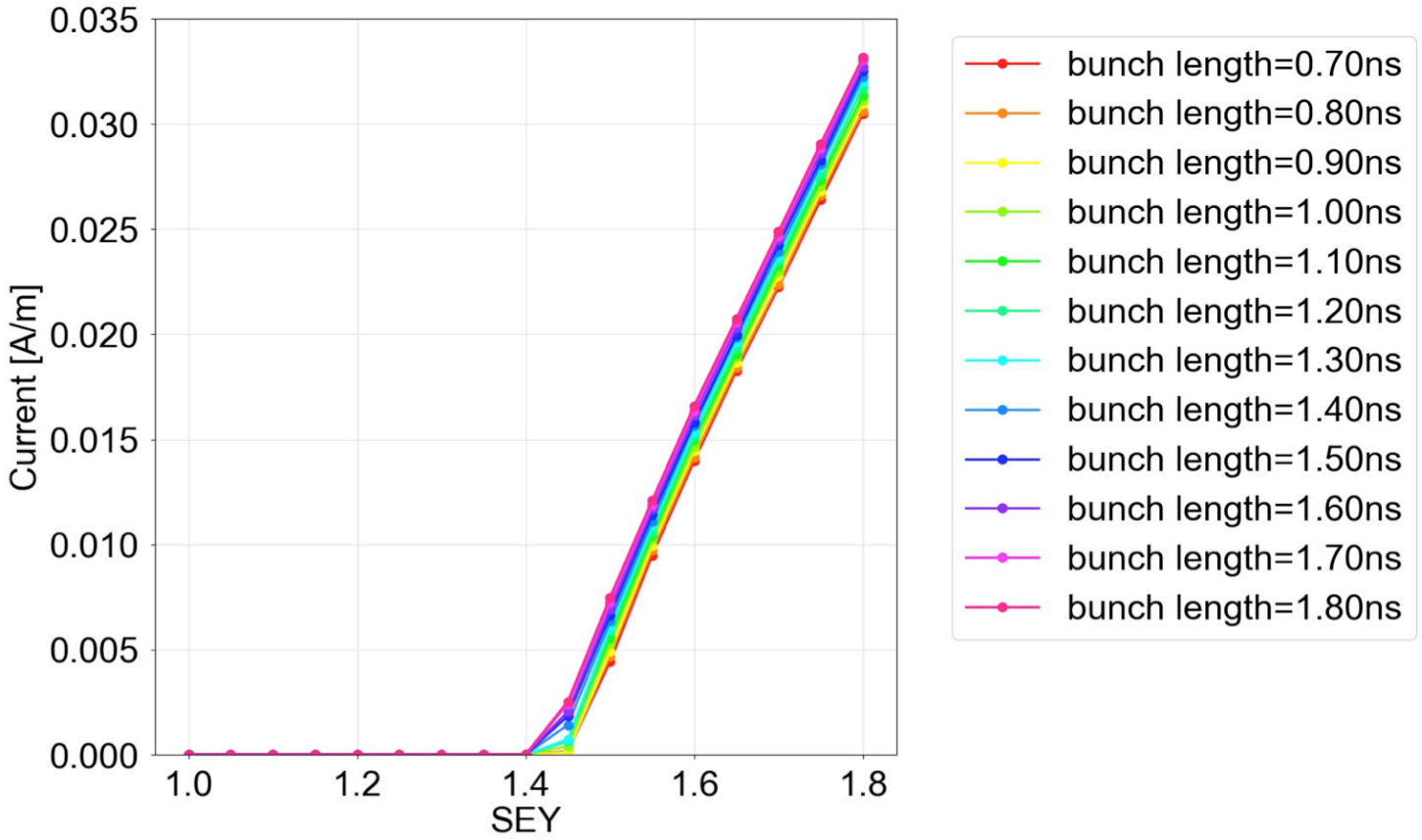
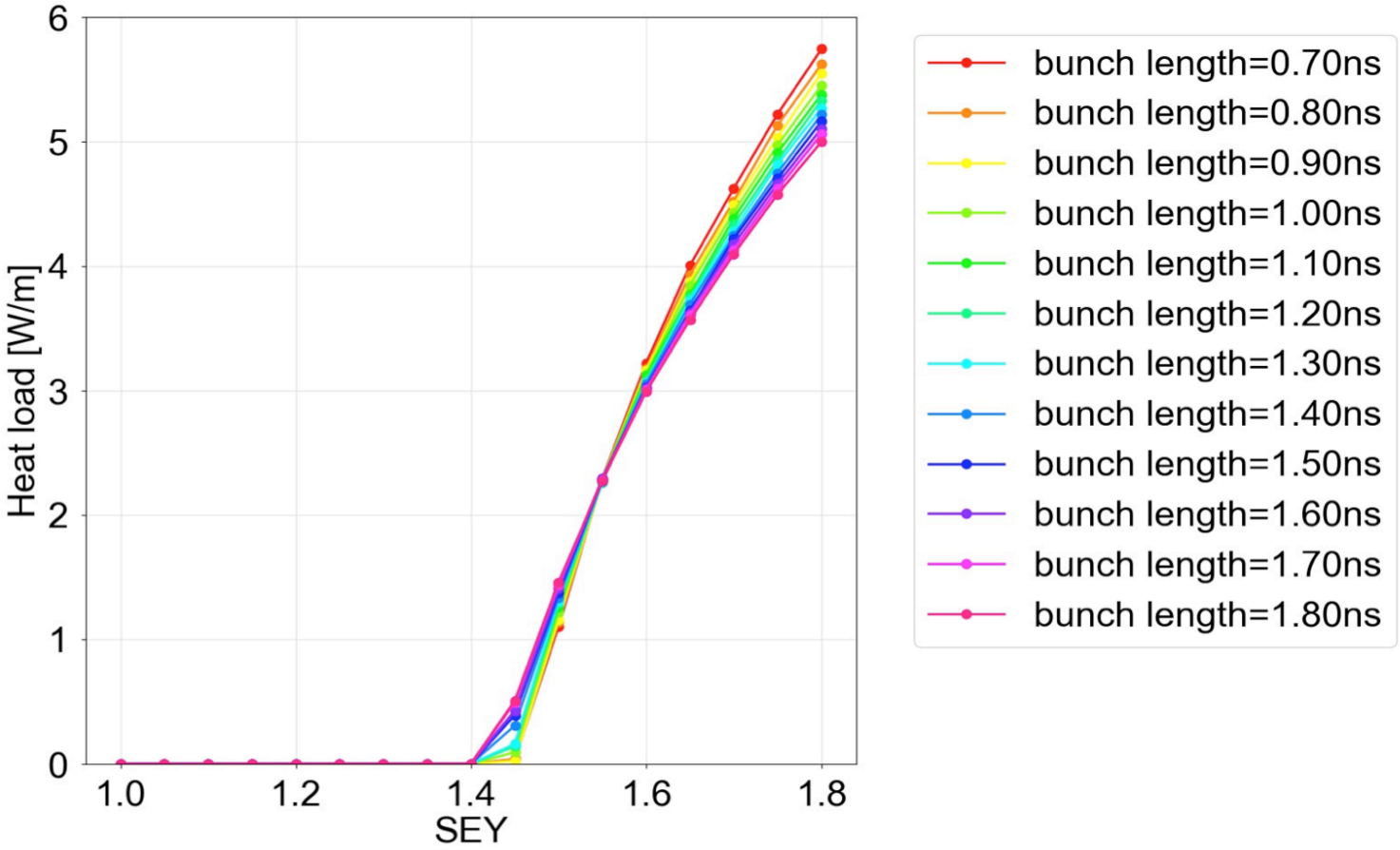
SEY threshold



- The SEY threshold is 1.4 for all simulated bunch lengths

SEY threshold



- The SEY threshold is 1.4 no matter which bunch length is used

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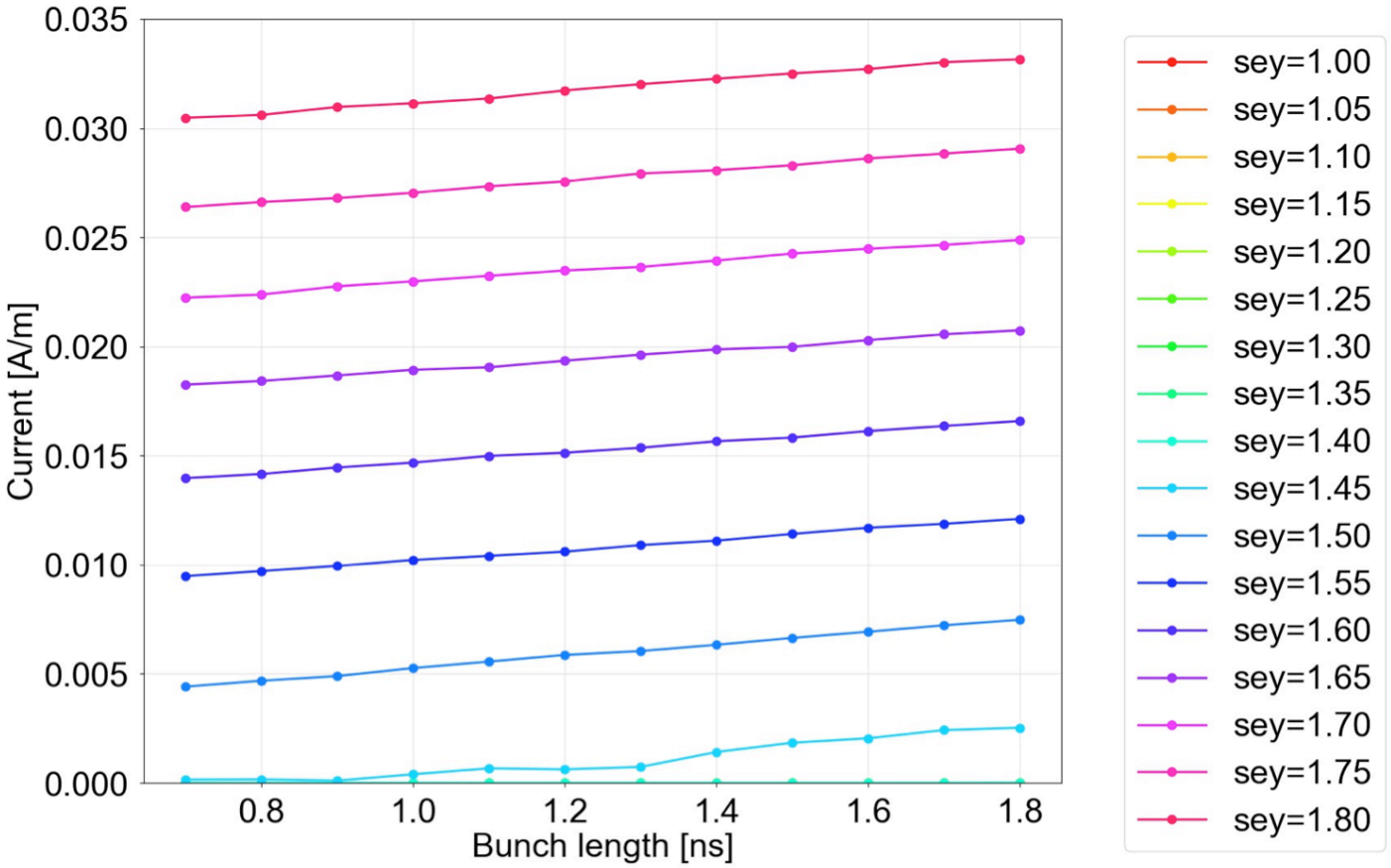
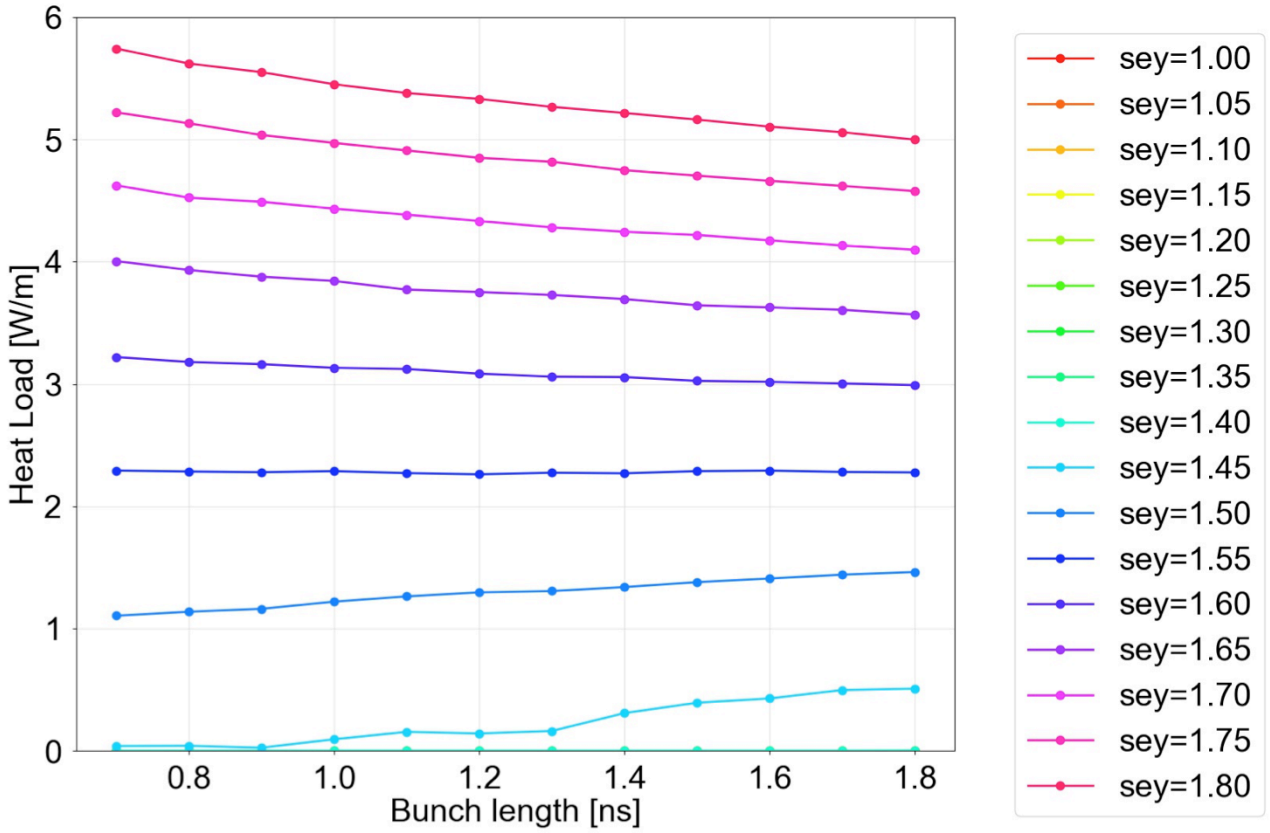
Current vs bunch length



- The current is increasing linearly with the bunch length

Heat load vs bunch length



- For low SEYs the HL increases with growing bunch lengths
- For high SEYs it decreases instead

Outline

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Summary

- The SEY threshold is 1.4 for all bunch lengths in the range 0.7-1.8 ns according to simulations
- The current is increasing linearly with the bunch length
- For low SEYs the heat load increases with increasing bunch length
- For high SEYs it decreases instead