



UNIVERSIDAD DE
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ELECTRON-CLOUD SIMULATIONS FOR LHC DIPOLES BASED ON THE COMPUTED PHOTOEMISSION DISTRIBUTION

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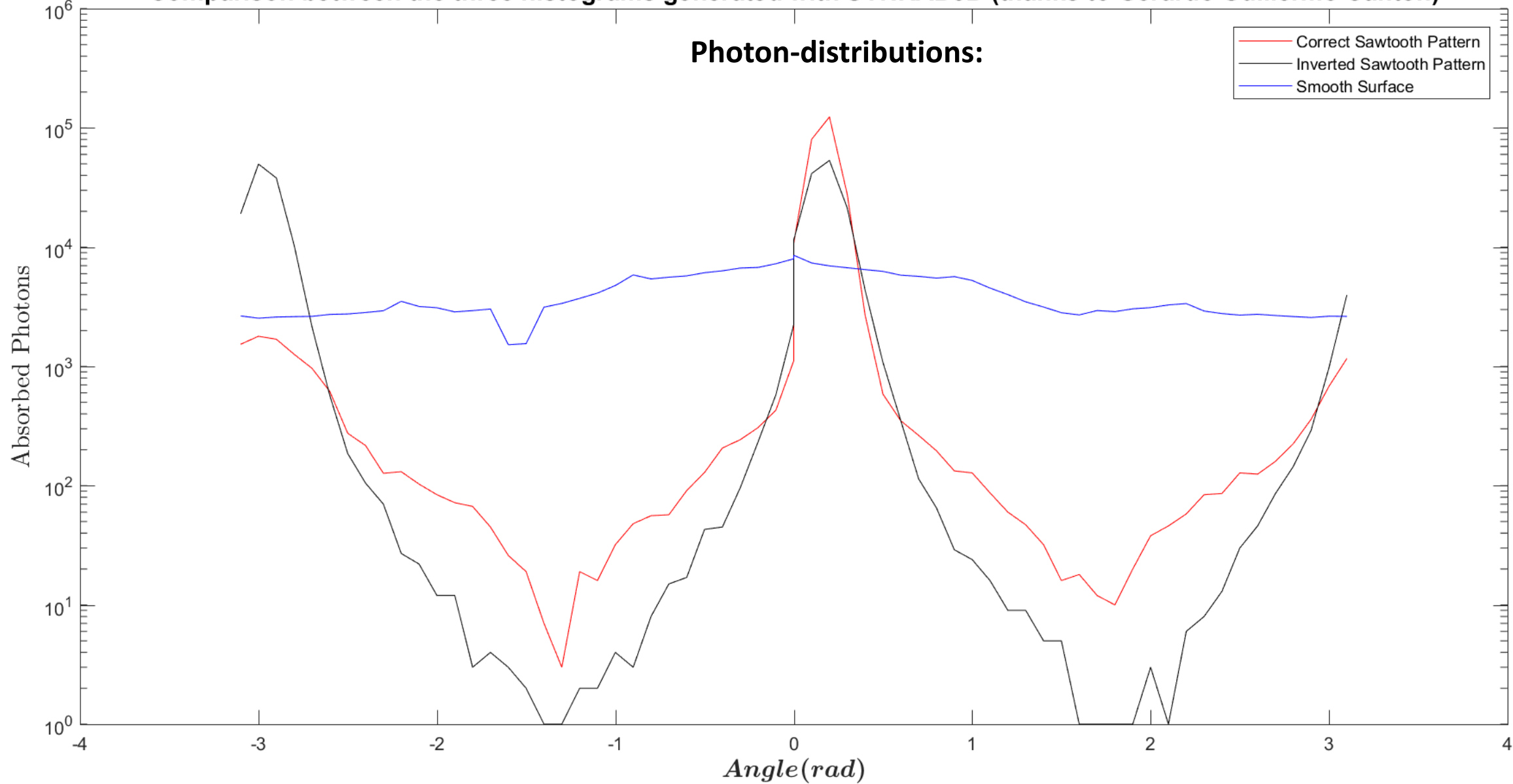
HUMBERTO MAURY CUNA

Simulation parameters

Simulations were performed using a modified version of PyELOUD able to handle a photon-distribution input file (*thanks to Giovanni Iadarola*).

- ❖ SEY values from: 1.0 to 1.7 in steps of 0.1.
- ❖ Beam energy = 6.5 TeV.
- ❖ Filling pattern (repeated 4 times):
 - 72 filled bunches.
 - 8 empty bunches.
- ❖ Bunch spacing = 25 ns.
- ❖ Vacuum chamber surfaces:
 - ❖ Smooth (without sawtooth pattern)
 - ❖ Sawtooth pattern with correct orientation
 - ❖ Sawtooth pattern with inverted orientation

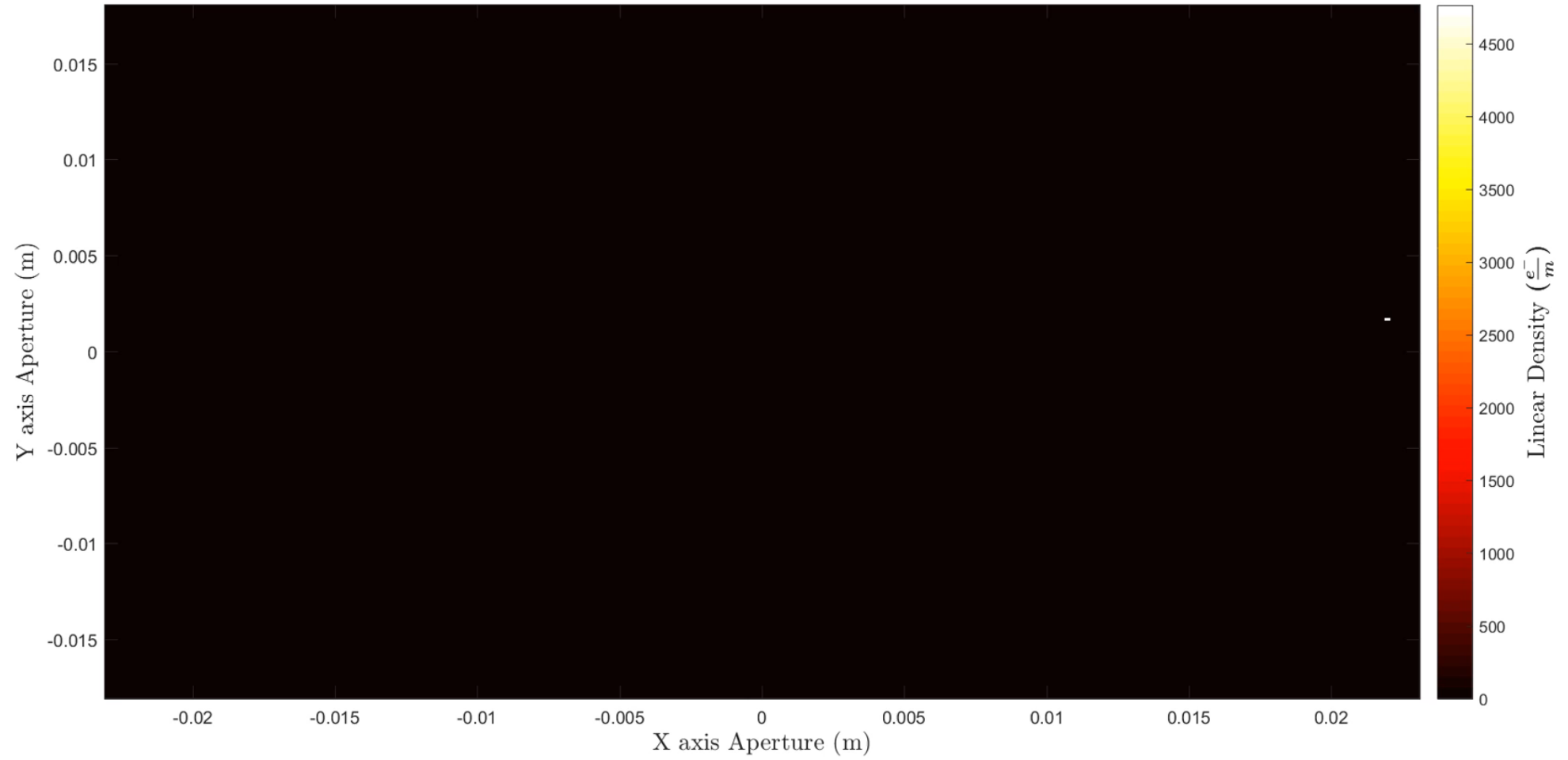
Comparison between the three histograms generated with SYNRAD3D (thanks to Gerardo Guillermo Canton)



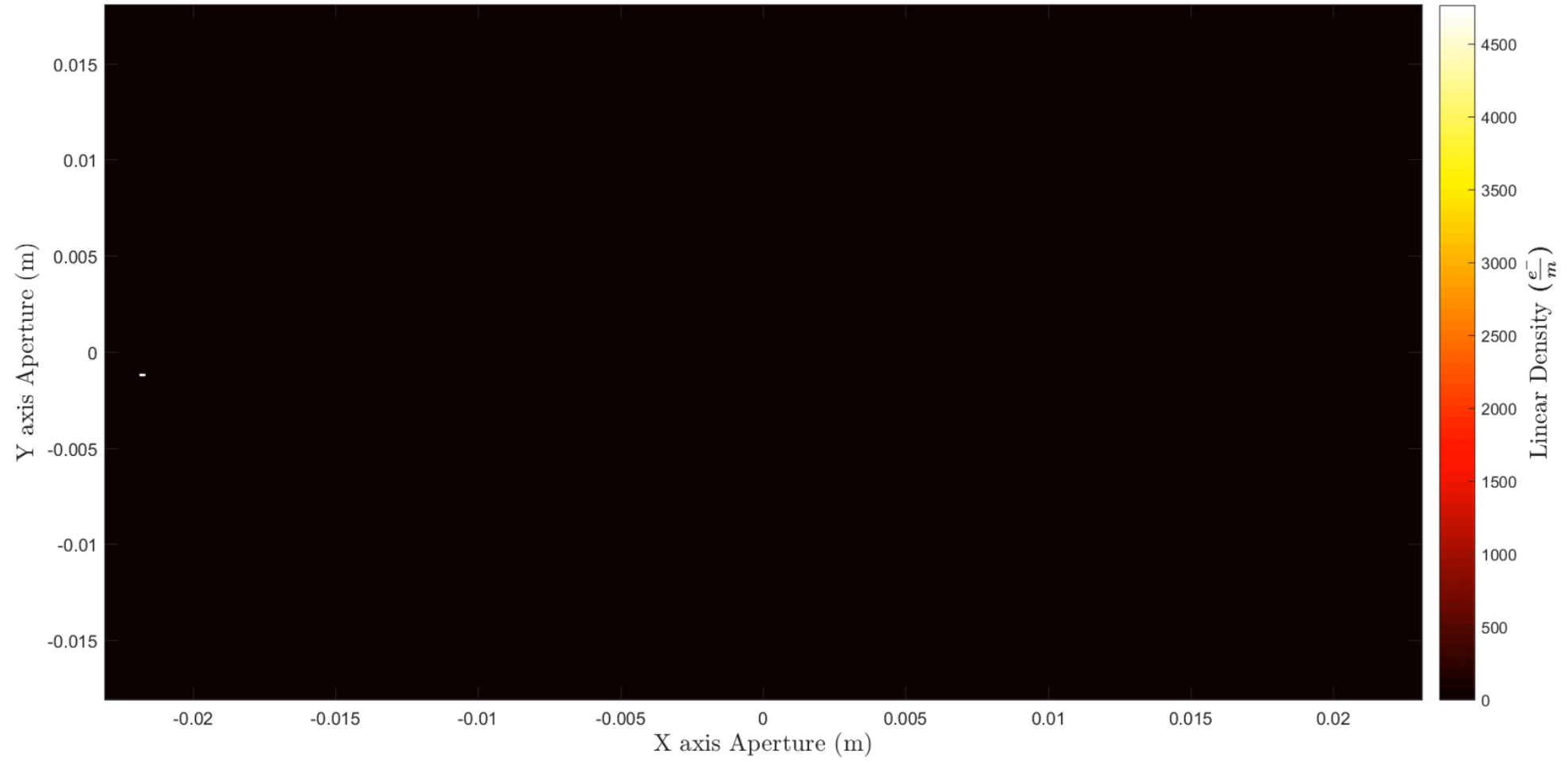
SIMULATION RESULTS

SMALL VIDEOS OF INITIAL ELECTRON DISTRIBUTIONS

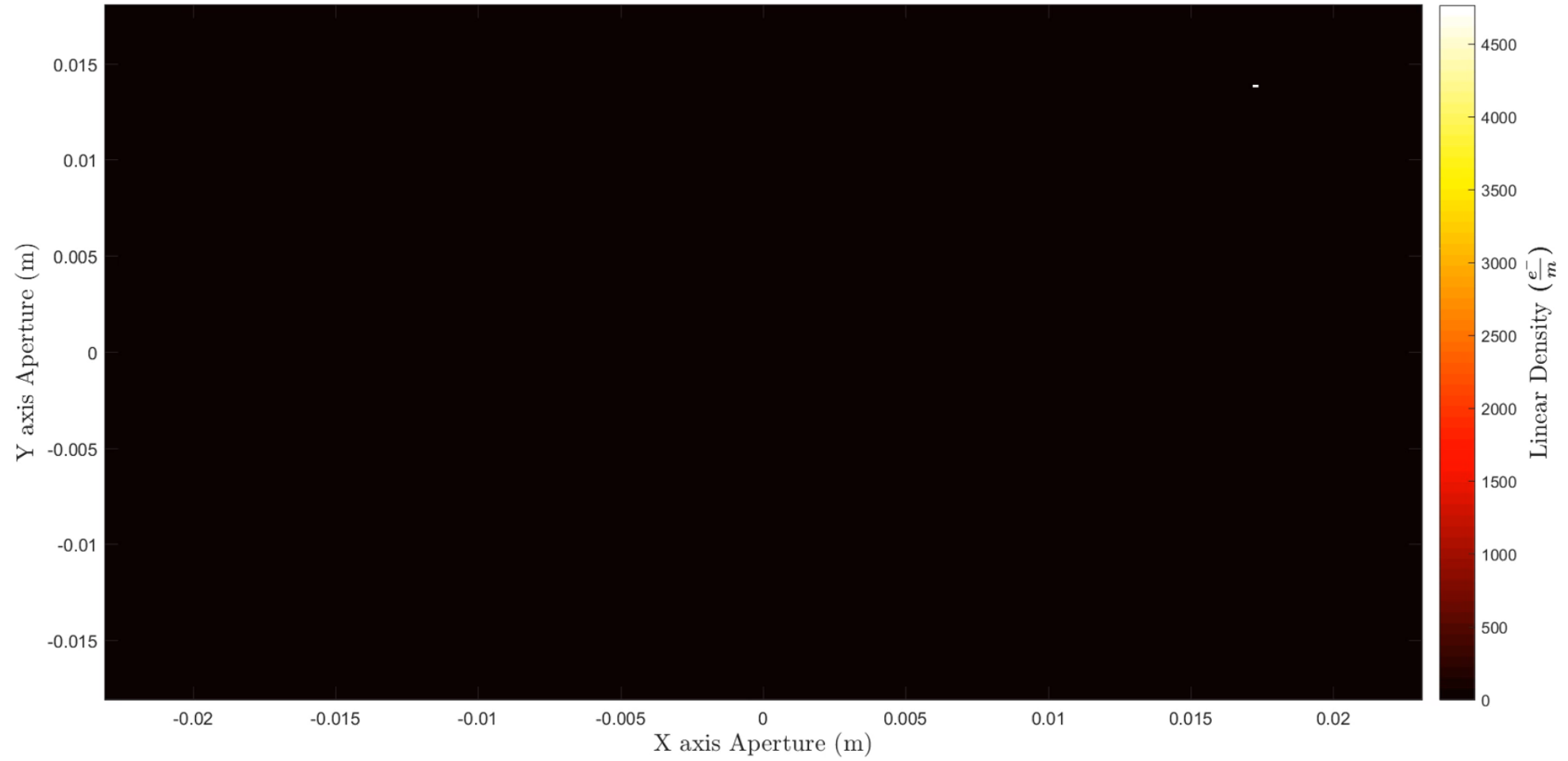
Macro Particles Distribution at 0.125 ns for Correct Sawtooth at SEY 1.4



Macro Particles Distribution at 0.125 ns for Inverted Sawtooth at SEY 1.4



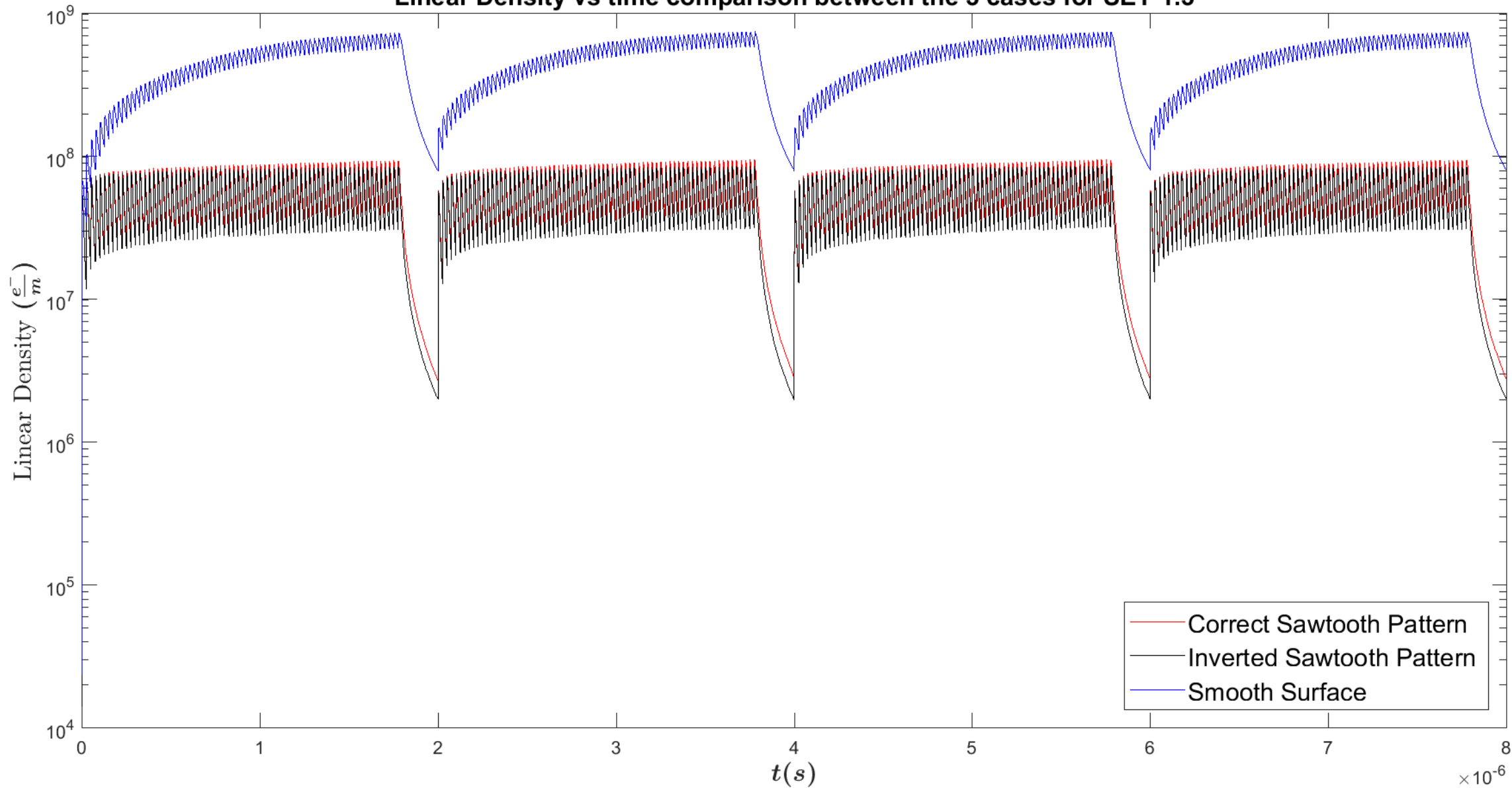
Macro Particles Distribution at 0.125 ns for Smooth Surface at SEY 1.4



SIMULATION RESULTS

FOR THE THREE VACUUM CHAMBER SURFACES

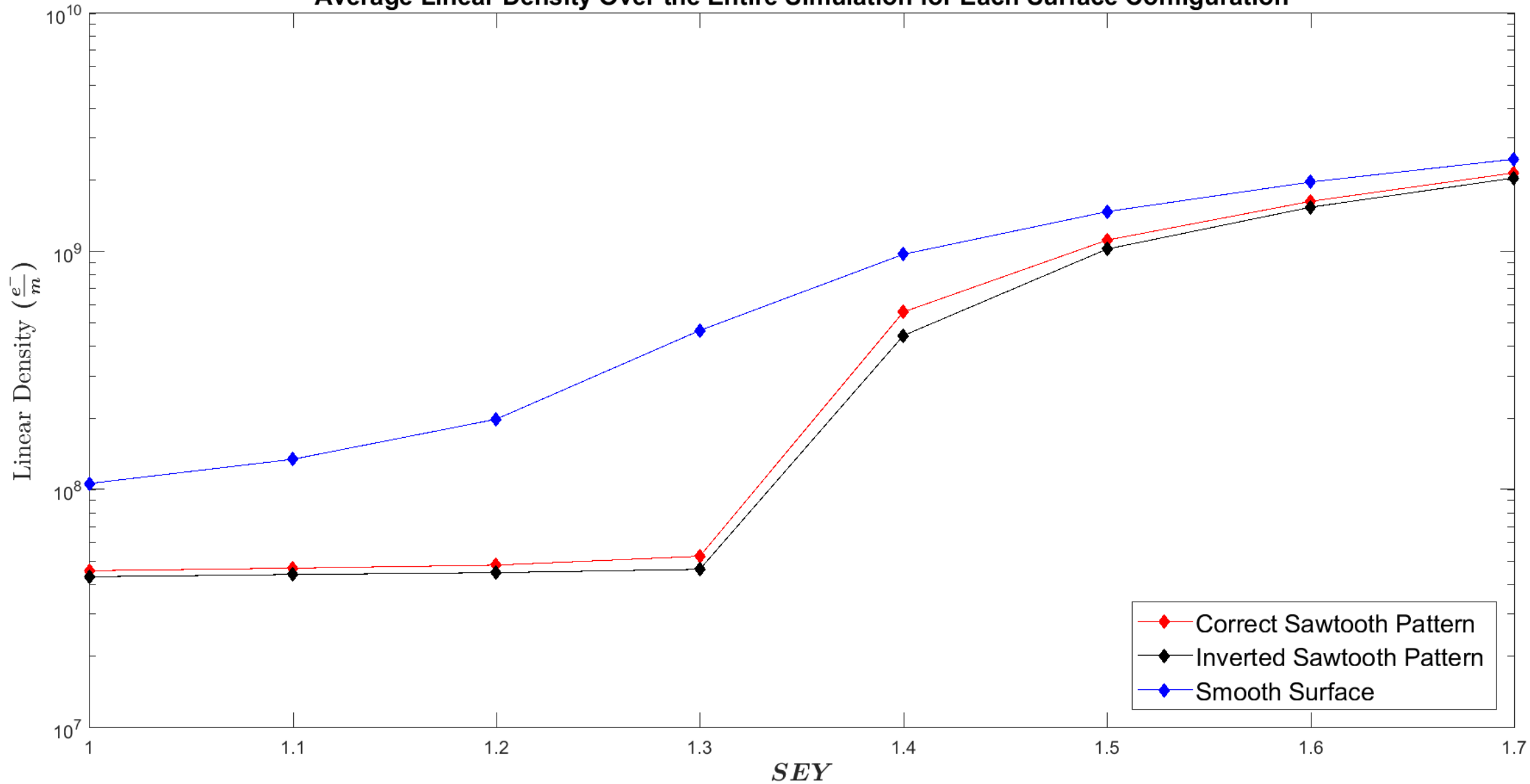
Linear Density vs time comparison between the 3 cases for SEY 1.3



SIMULATION RESULTS

LINEAR DENSITY ANALYSIS

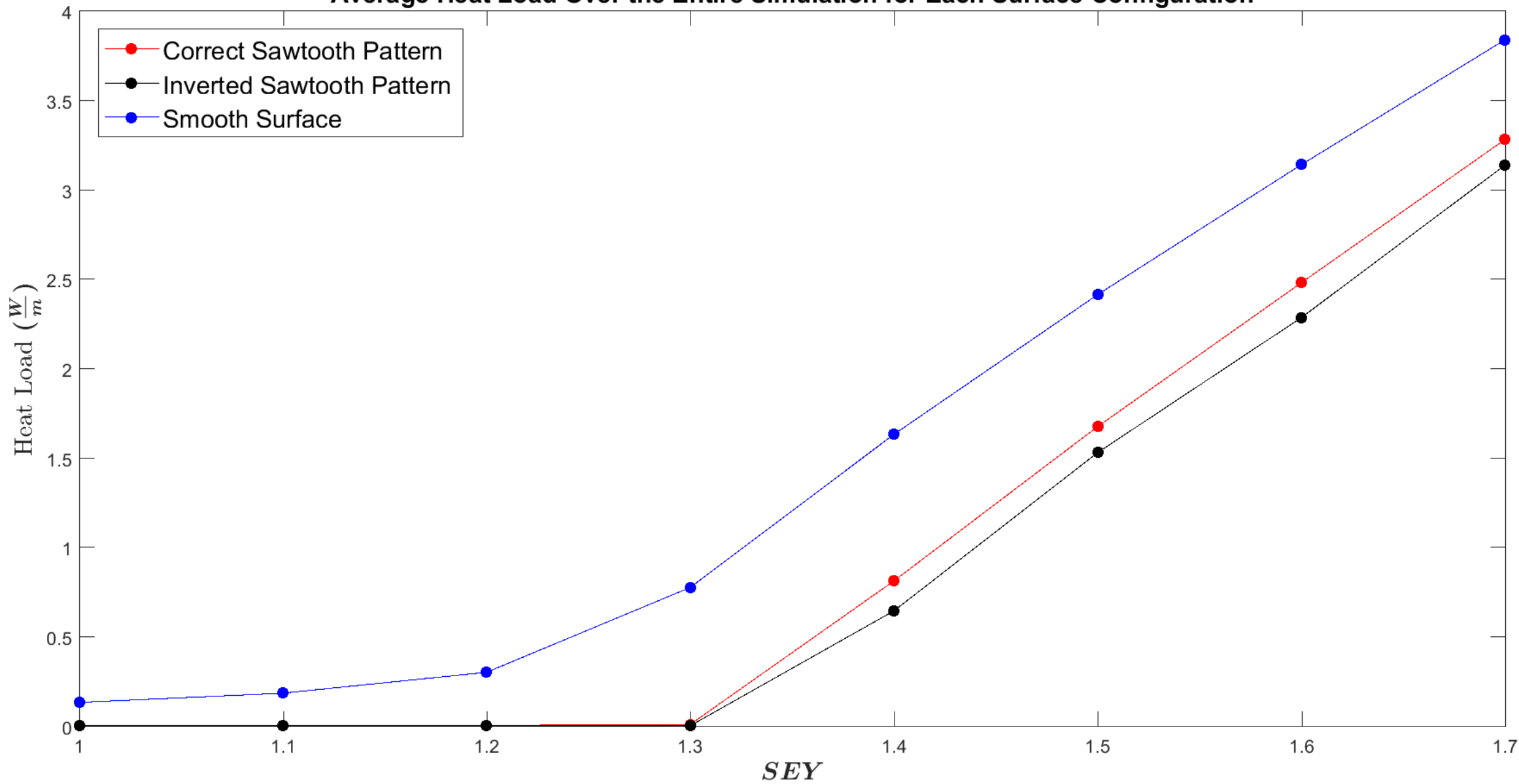
Average Linear Density Over the Entire Simulation for Each Surface Configuration



SIMULATION RESULTS

HEAT LOAD ANALYSIS

Average Heat Load Over the Entire Simulation for Each Surface Configuration



Conclusions

- ❖ Simulated linear density and heat load values are the lowest for the inverted-orientation sawtooth pattern.
- ❖ This difference tends to minimize for higher SEY (≥ 1.5).

**Thank you very much for
your attention**