



# Space-charge studies on multi-stage ionization cooling lattices

Diktys Stratakis

Physics Department

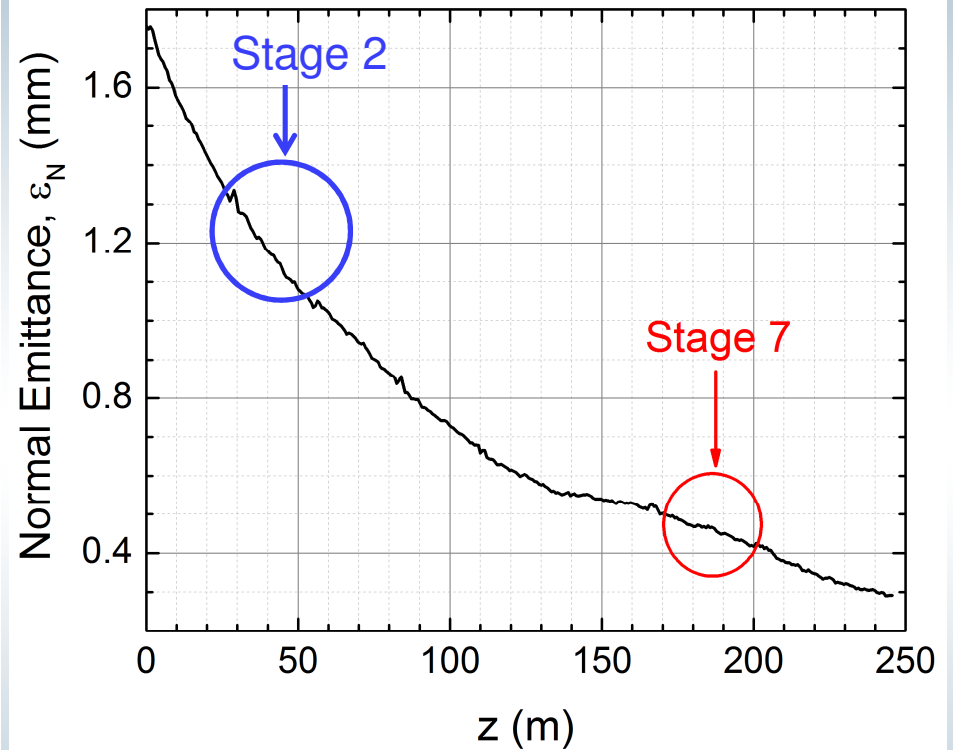
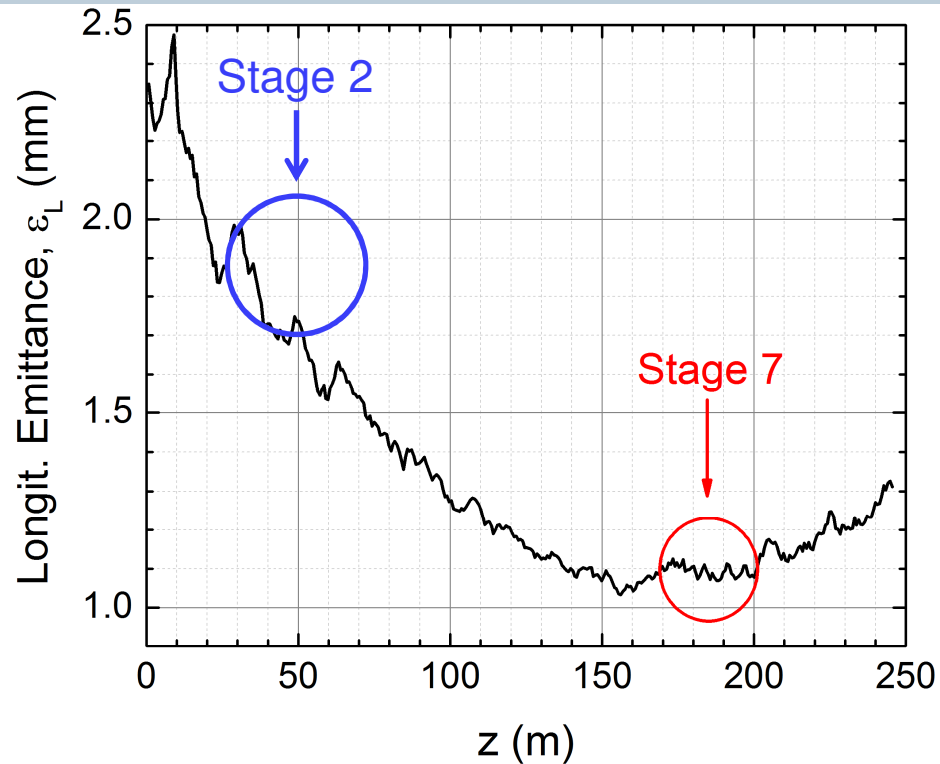
Brookhaven National Laboratory

**DISCUSSION**

AAG Group Meeting

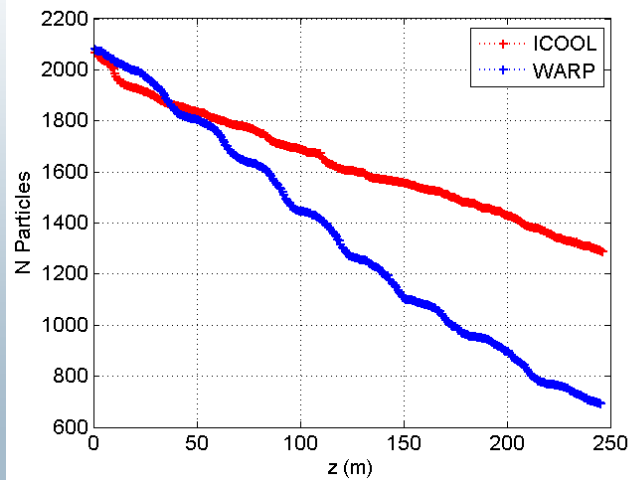
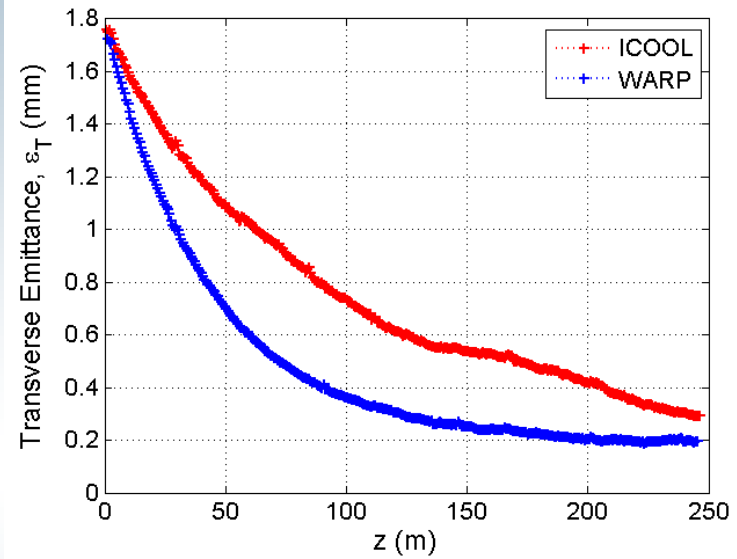
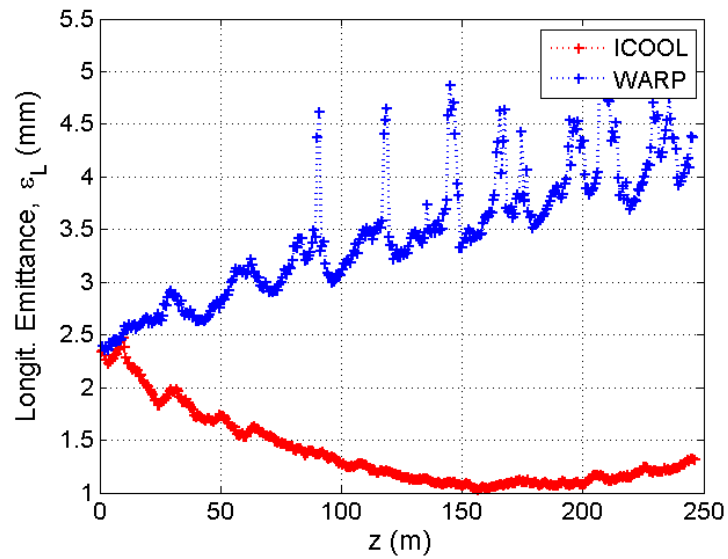
January 31, 2013

# Final 6D Cooling

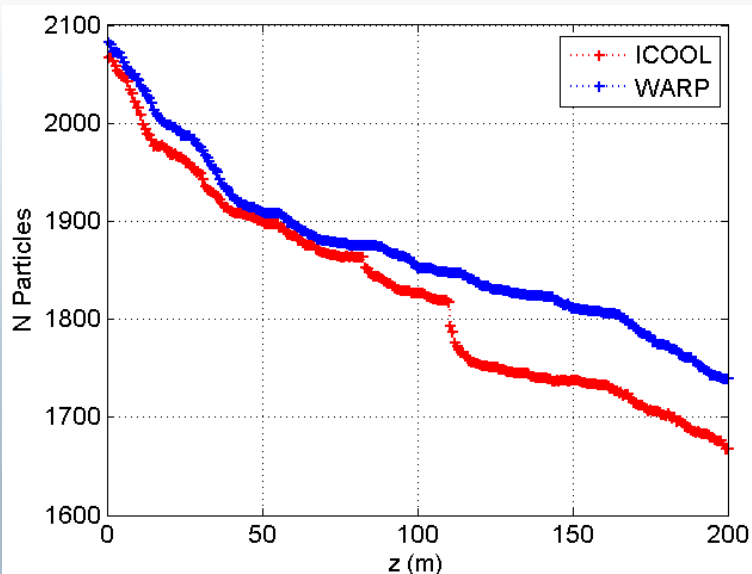
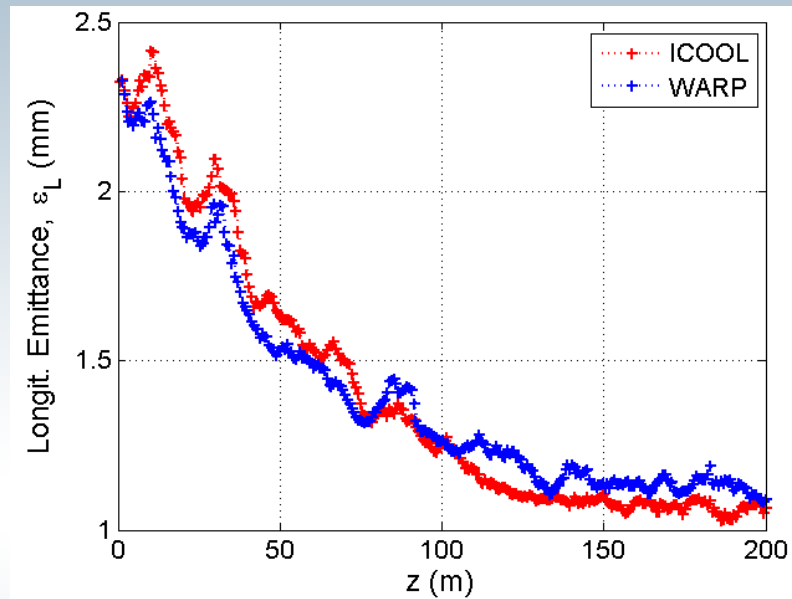
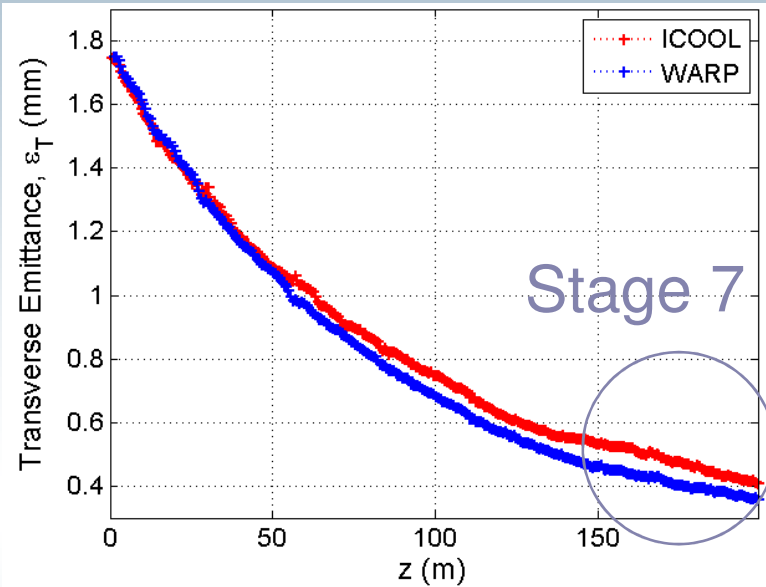


- Study space-charge effects on Stage 2 & Stage 7

# A few weeks ago...

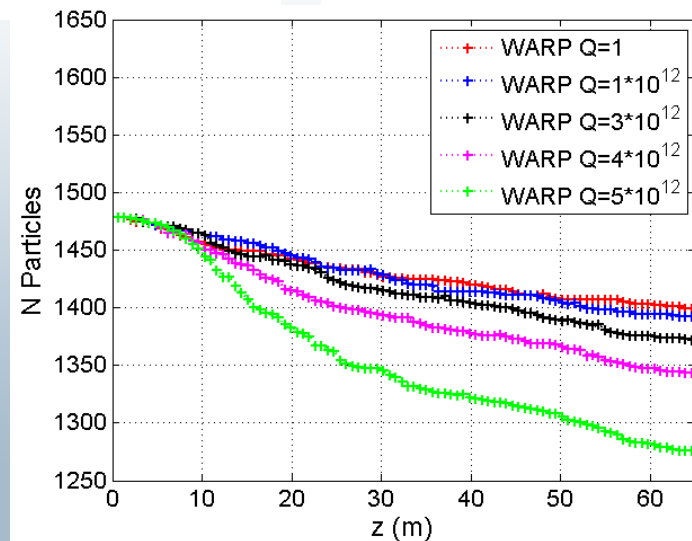
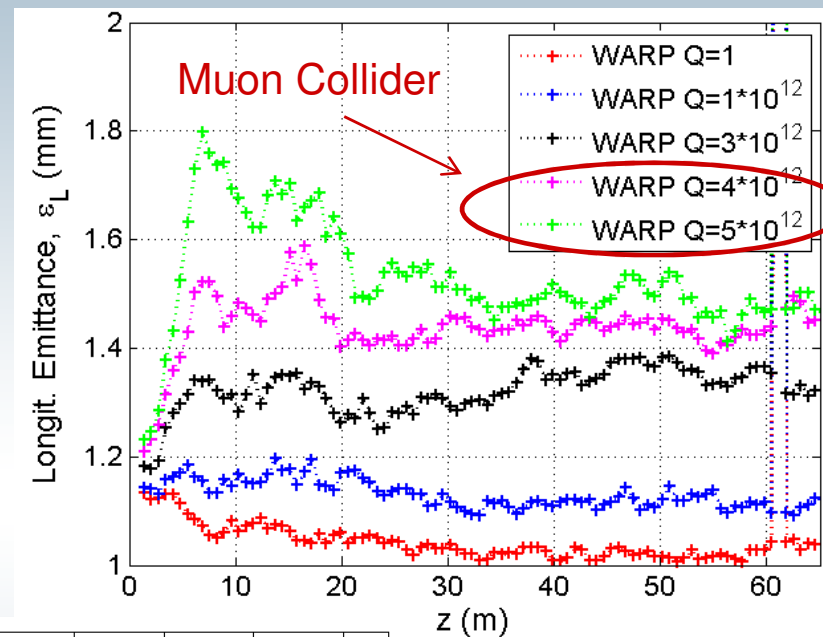
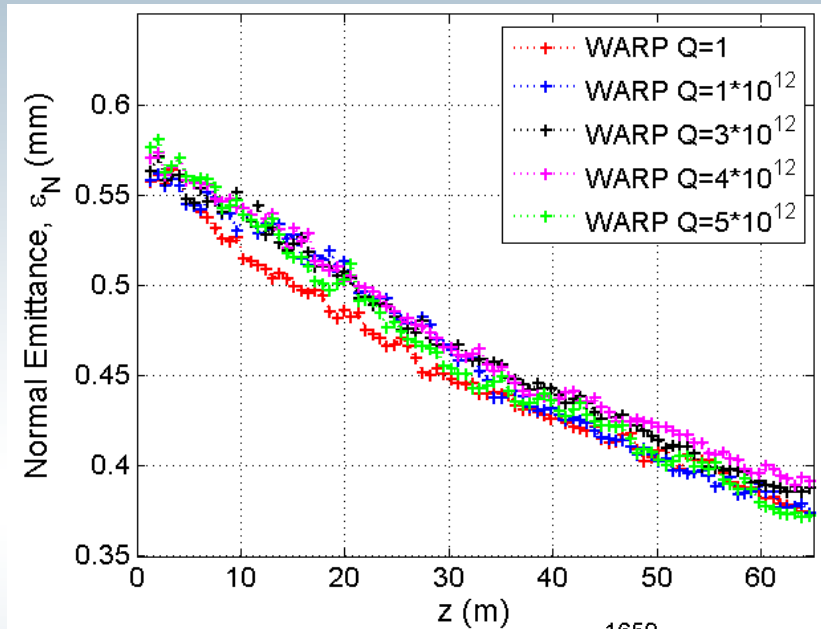


# This week...

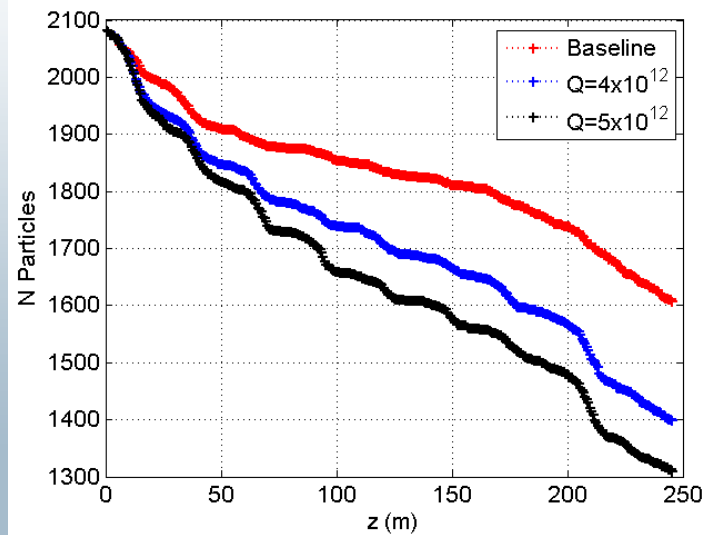
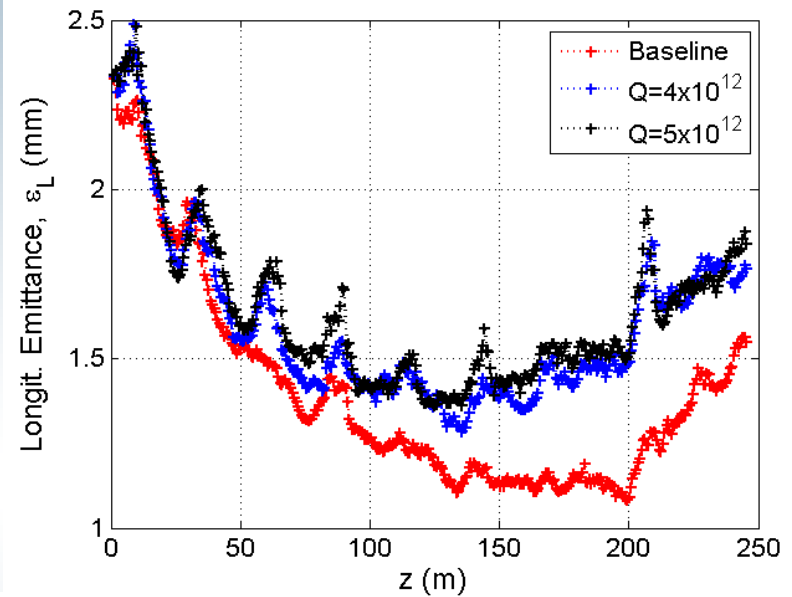
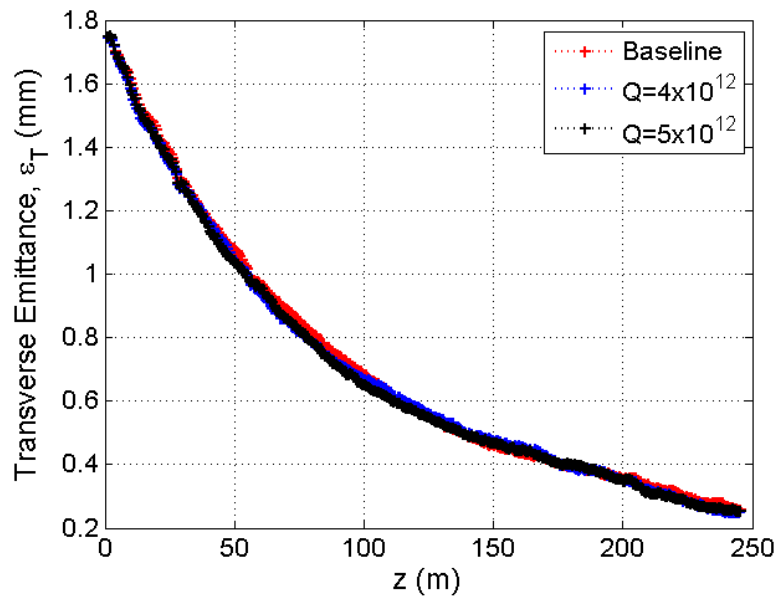


- Simulated stages 1-7 of the last 6D Guggenheim
- No space-charge on this plots
- ICOOL: Idecay=false
- 2,100 particles

# Space-Charge effects for $\epsilon_l=1$ mm (Stg. 7)

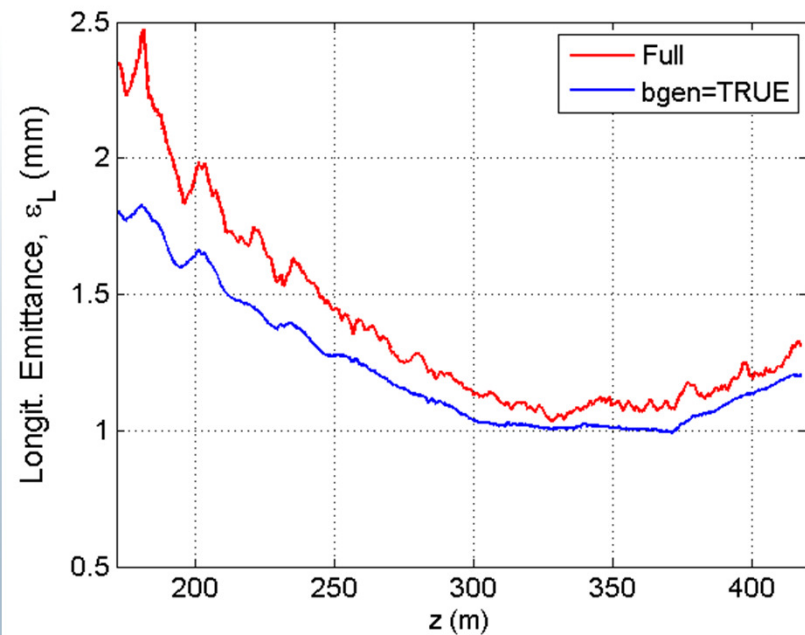
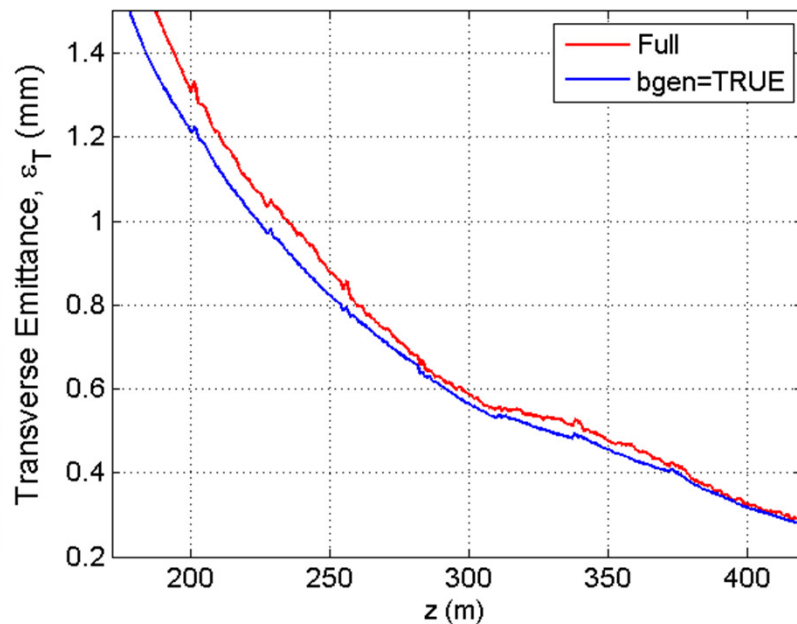


# Multi-stage simulation with SC included

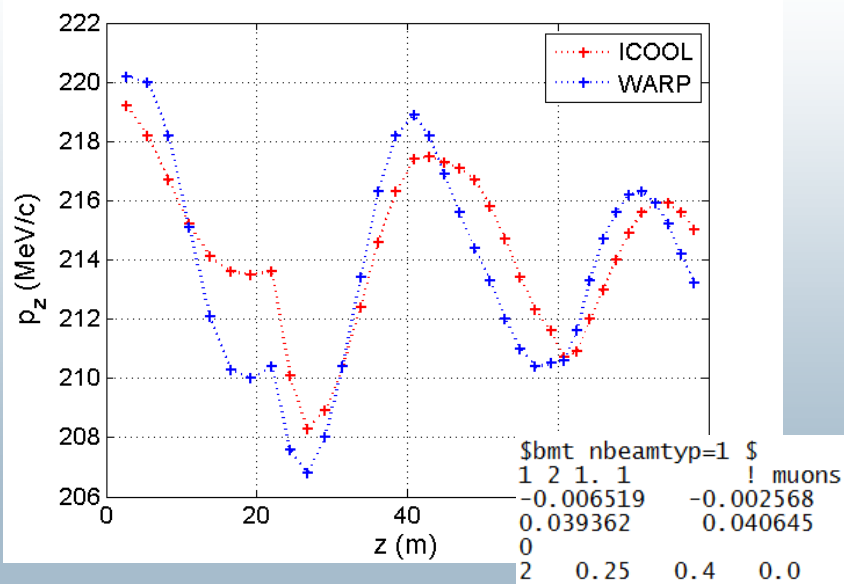
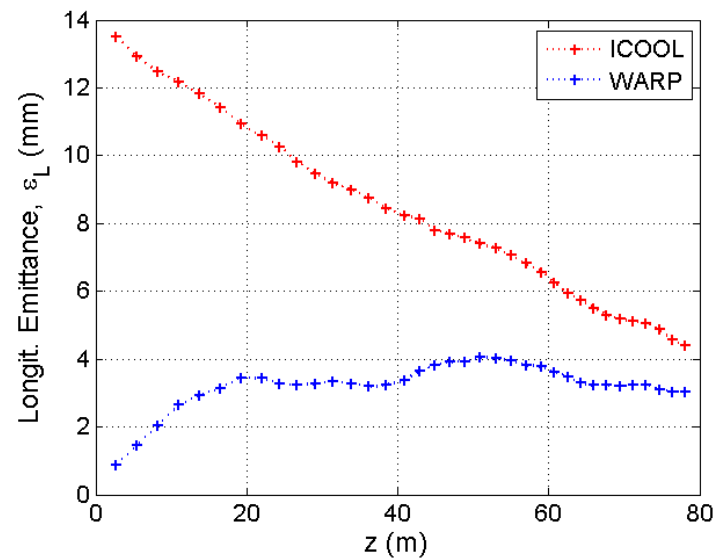
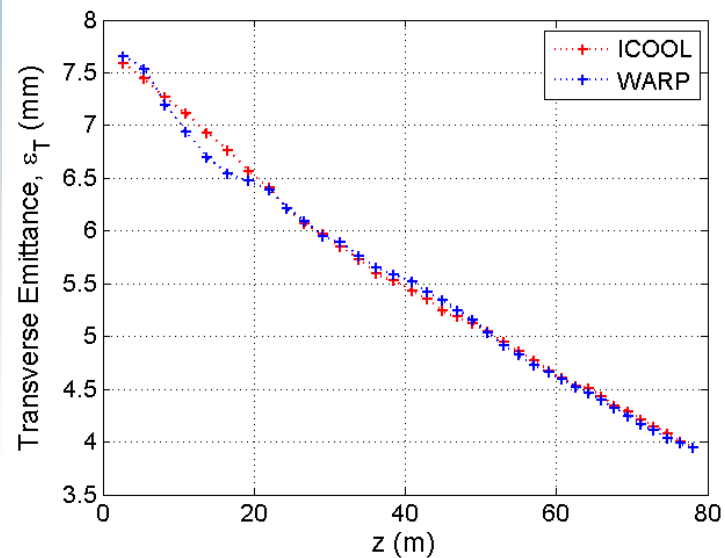


# Notes

- Can I increase the number of particles?
- Created a Gaussian with same rms parameters but no correlations.
- Simulation after the merger with 100,000 particles
- **Results below “start” 170 m AFTER the merger**



- But what happens at  $z=0$ ?



```

$bmt nbeamtyp=1 $
1 2 1. 1 ! muons
-0.006519 -0.002568 0.0 -0.000367 -0.000310 0.217841 !mean: x y z px py pz
0.039362 0.040645 0.0 0.021043 0.020965 0.015080 !sigmas
0
2 0.25 0.4 0.0

```