



Space-charge studies for muon cooling lattices

Diktys Stratakis

Physics Department

Brookhaven National Laboratory

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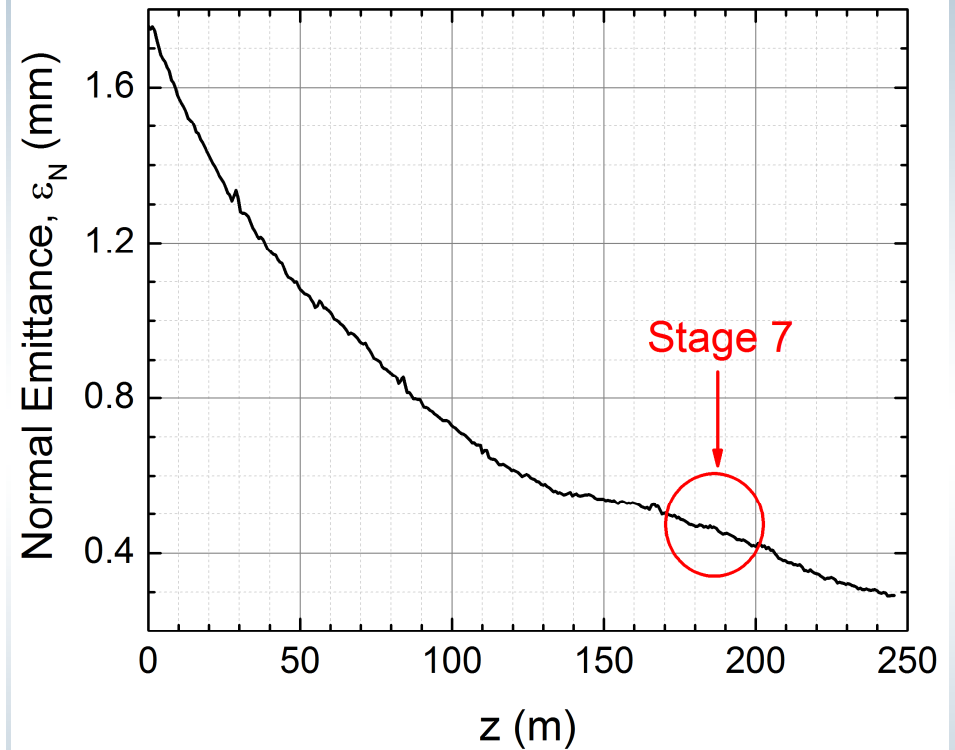
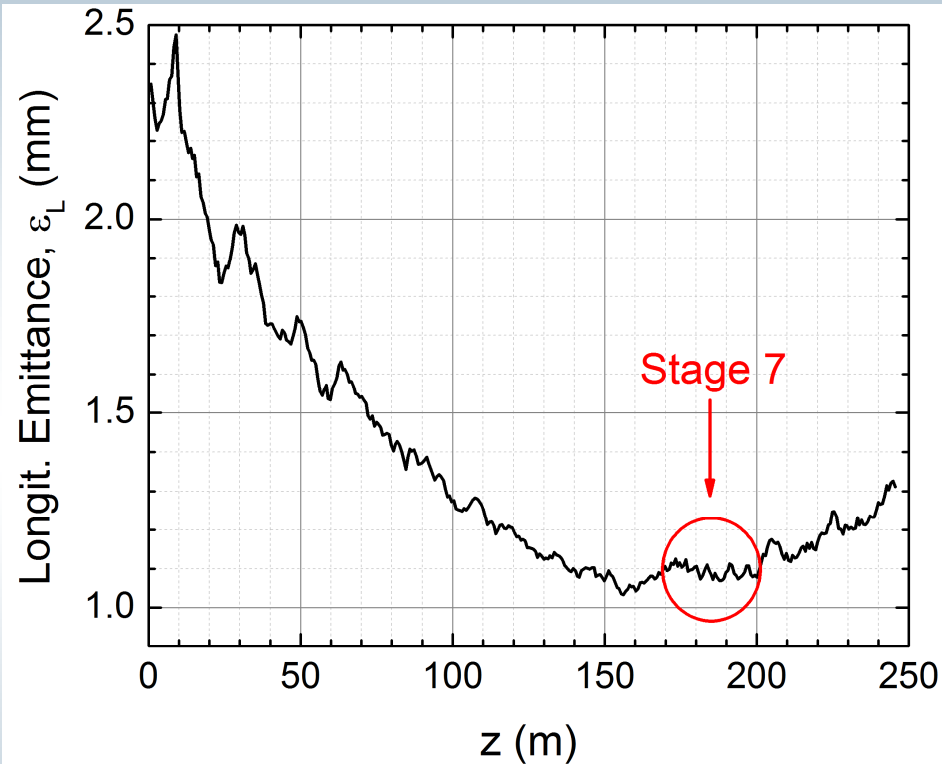
Outline

- Description of a post-merge 6D cooling lattice
- Simulation results without space-charge
 - ICOOL, G4BL and WARP
- Simulation with space-charge

Lattice Details

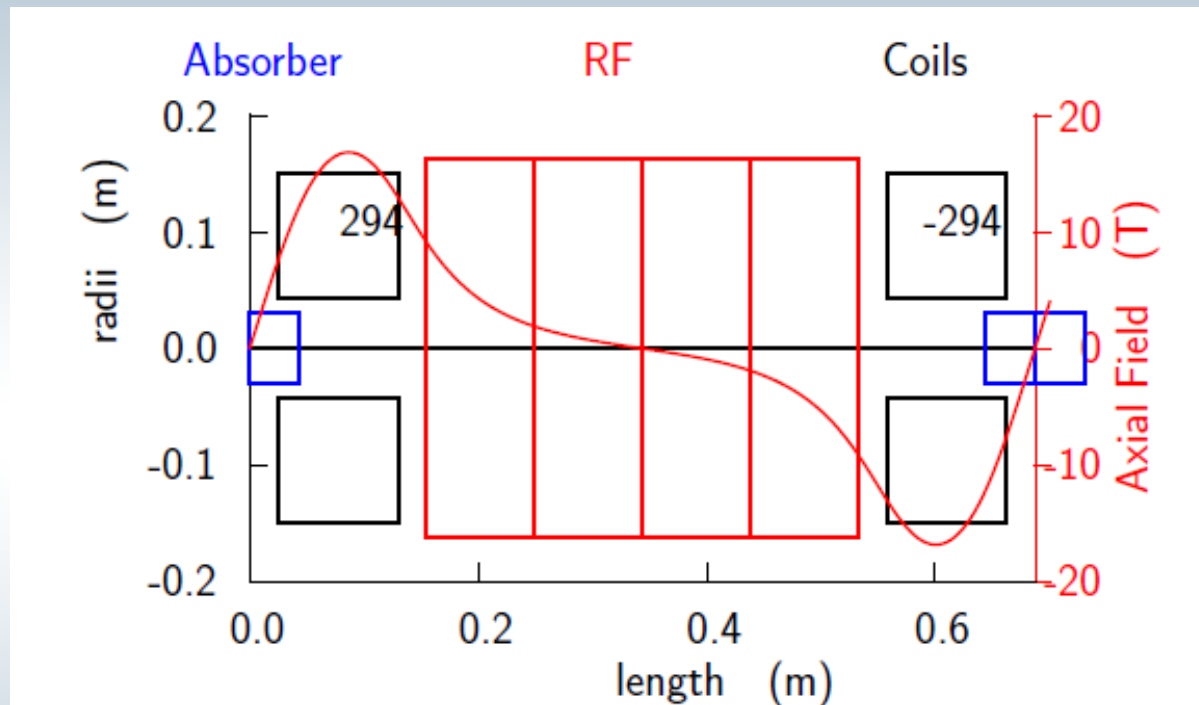
- Simulated a post merging 6D cooling lattice that I got from Rick on August 2010.
- It is a 8-Stage flip-field lattice with 805 MHz cavities
- Mainly LH absorbers except the last stages that contain LiH
- Longitudinal cooling with an emittance exchange matrix

Cooling with all 8-Stages



- Based on those results I decided to perform space-charge studies for Stage 7.

Cooling Stage #7



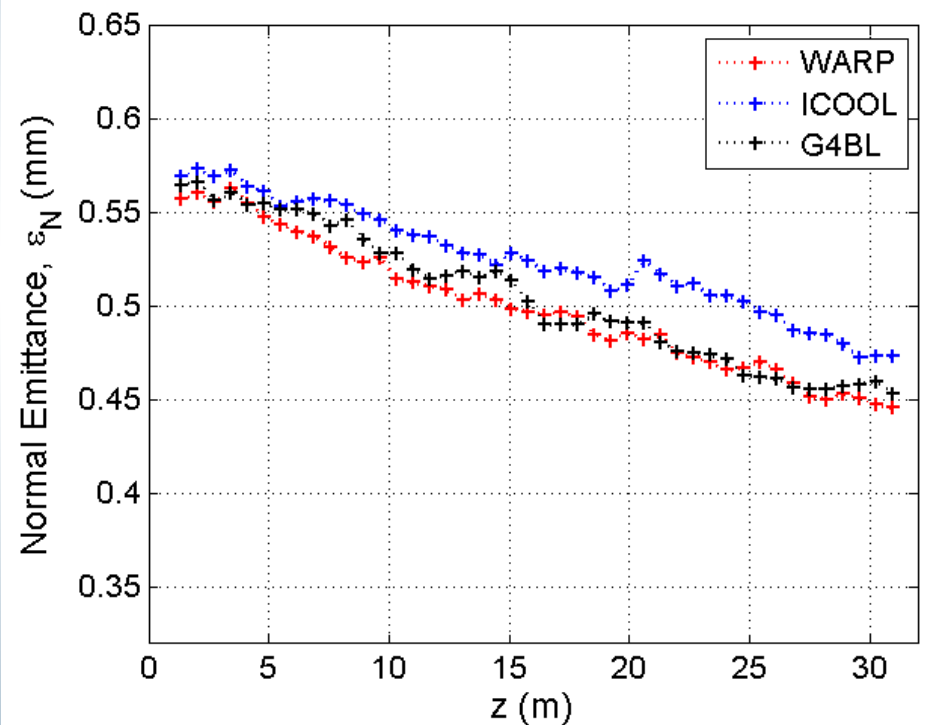
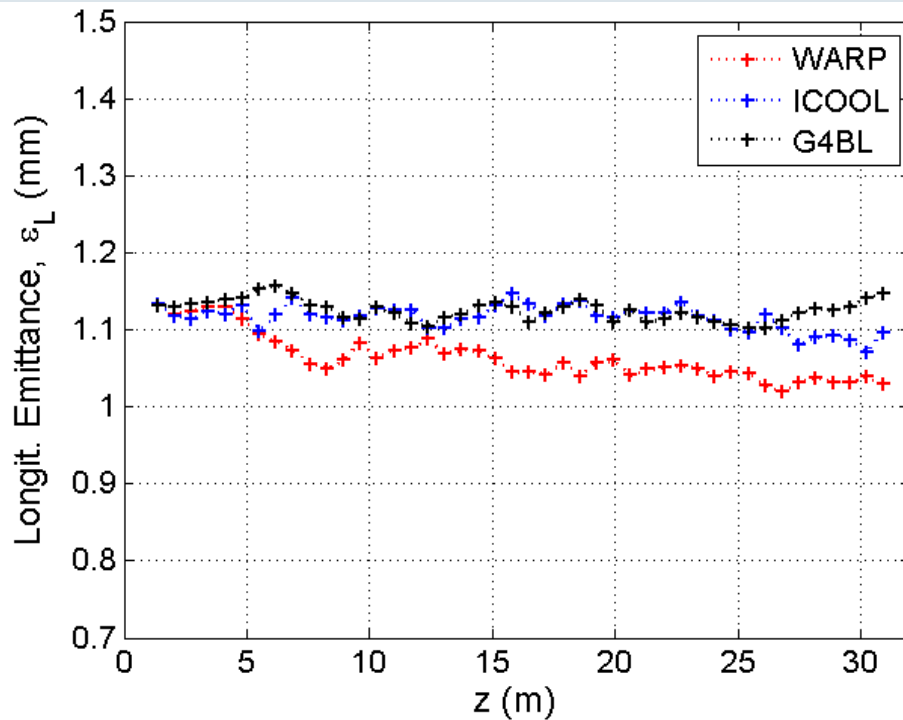
- Cell length 68.75 cm (45 cells)
- Absorber material is Lithium Hydride
- Total length is 30 m

Procedure & Achievements

- Created a deck with WARP that will simulate this stage (collaboration with Dave Grote)
 - Compared with ICOOL
 - First results with space-charge effects included
- Generated a similar deck with G4BL
 - Added an emittance exchange matrix in G4BL
 - Reasonable agreement with ICOOL
 - In progress of testing a space-charge model

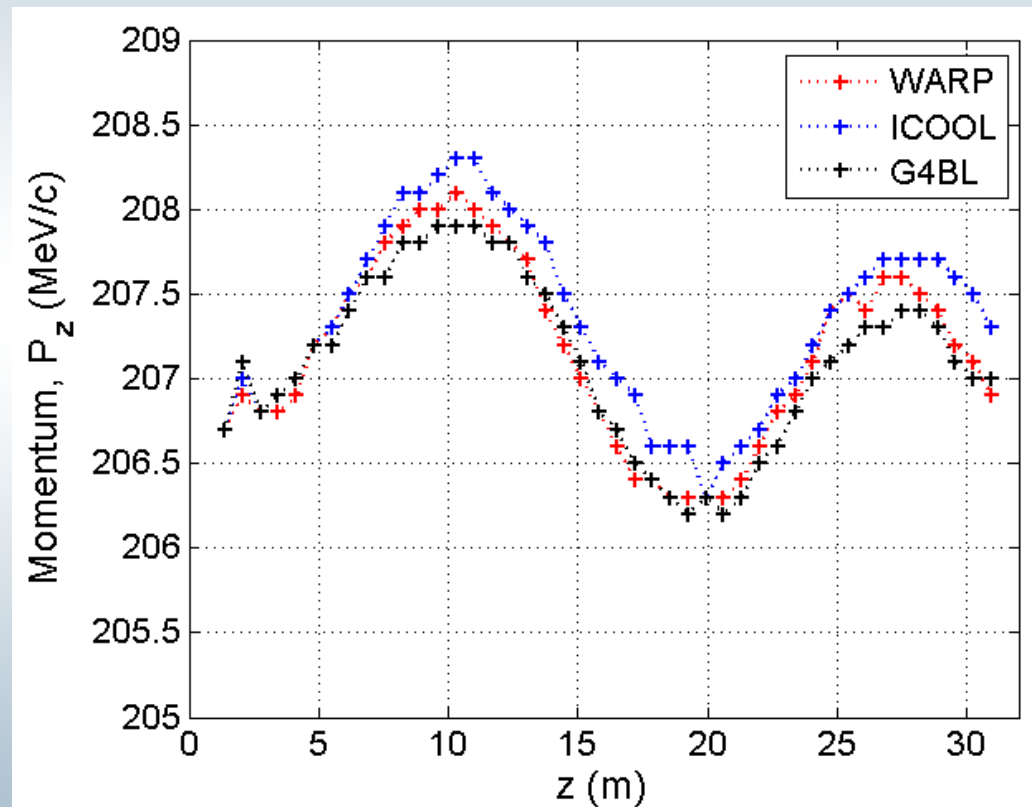
Stage 7 – No Space-Charge

- N=1,500 particles, Straglev=4, Scatlev=6, Idray=ON

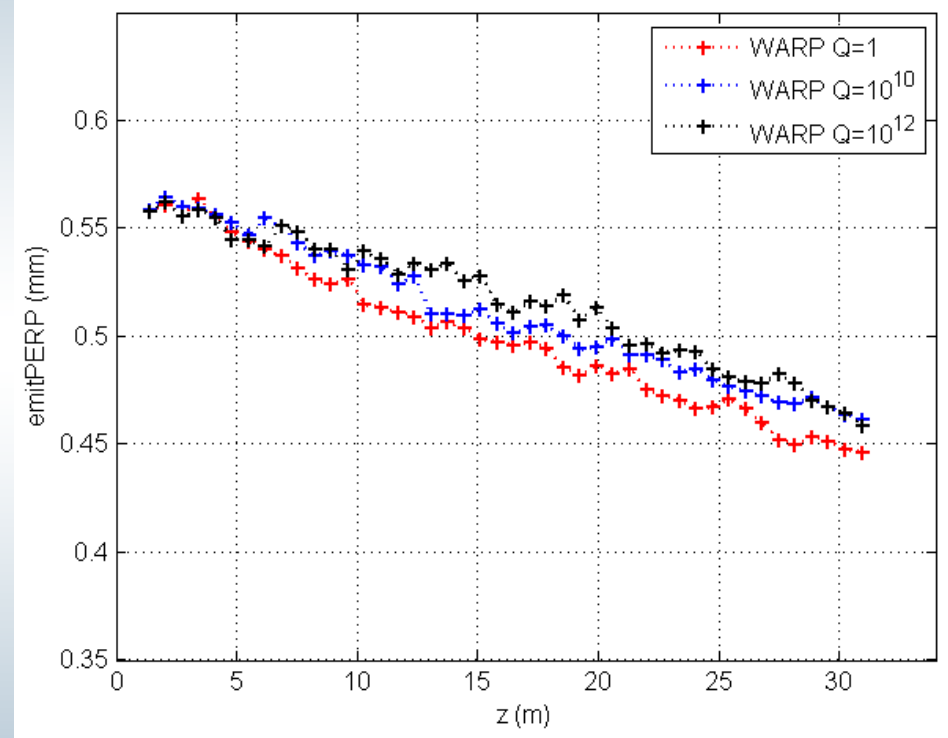
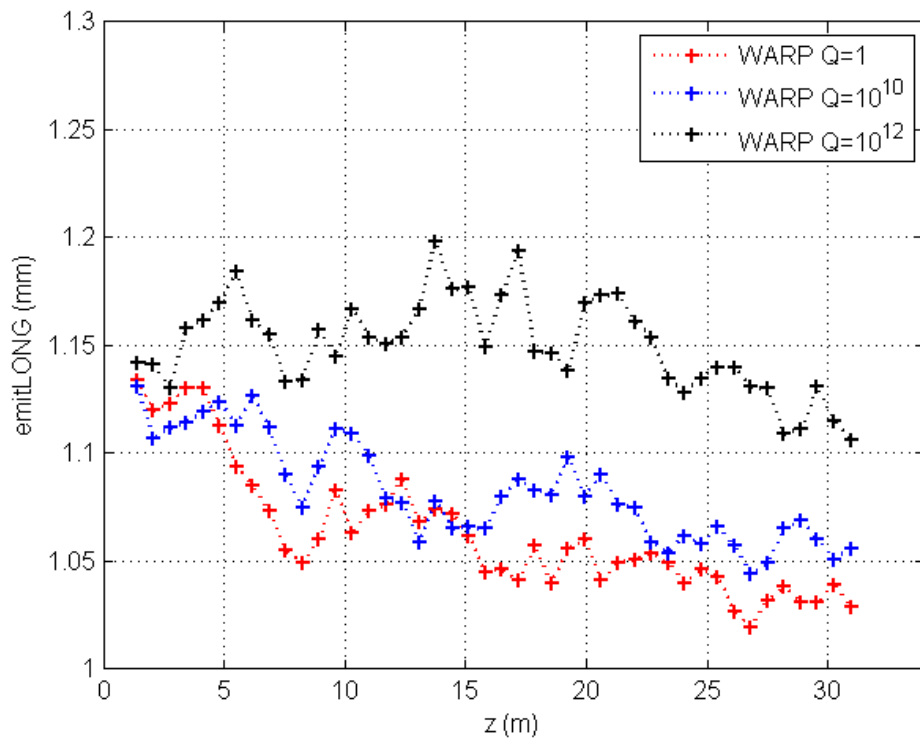


Stage 7 – No Space-Charge

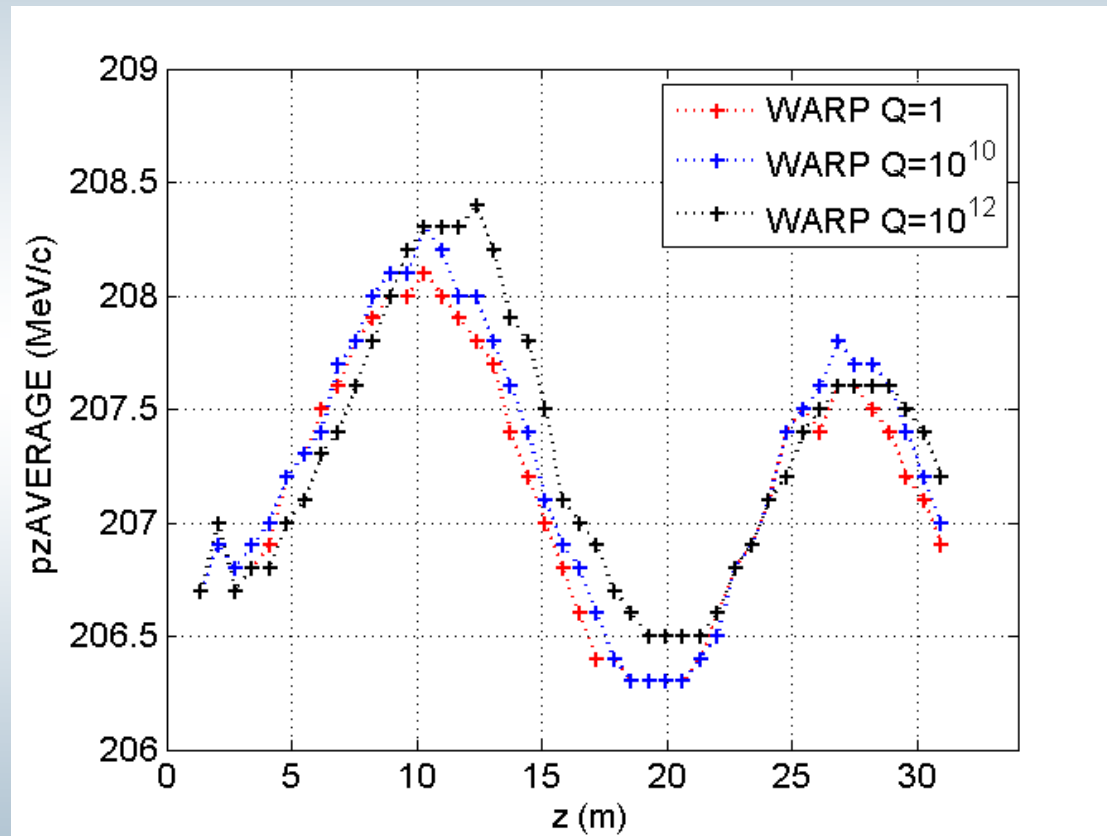
- N=1,500 particles, Straglev=4, Scatlev=6, ldray=ON



Stage 7 –With Space-Charge



Space-Charge Studies (2)



To do

- Increase number of decimal digits in for003.dat file
- Double-check distances/ constants in codes
- Add stage 6 and 8?