

GPT Simulations: Buncher position with Updated Front End

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The logo for Jefferson Lab, featuring a stylized red and black graphic of a particle detector or accelerator component to the left of the text "Jefferson Lab".

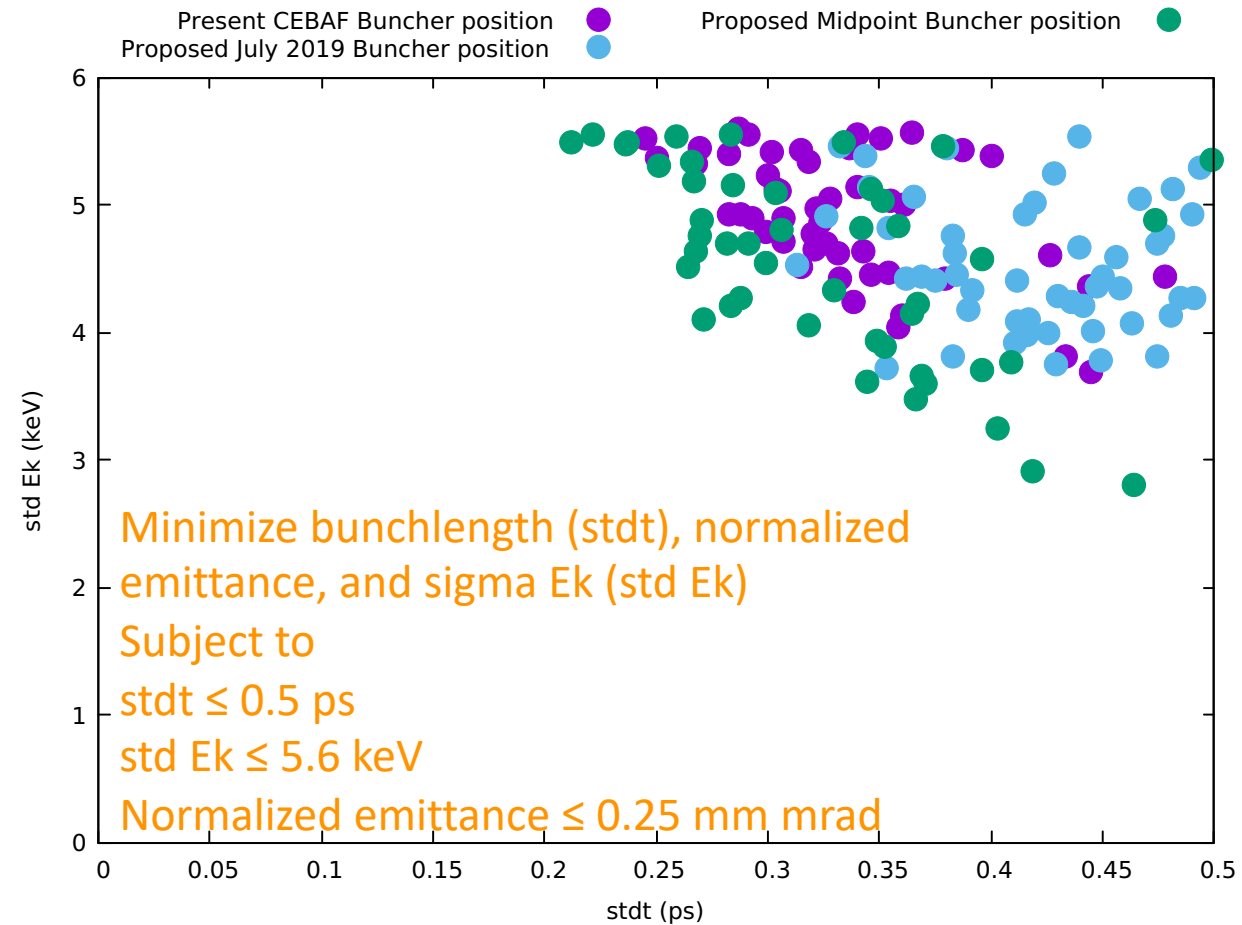
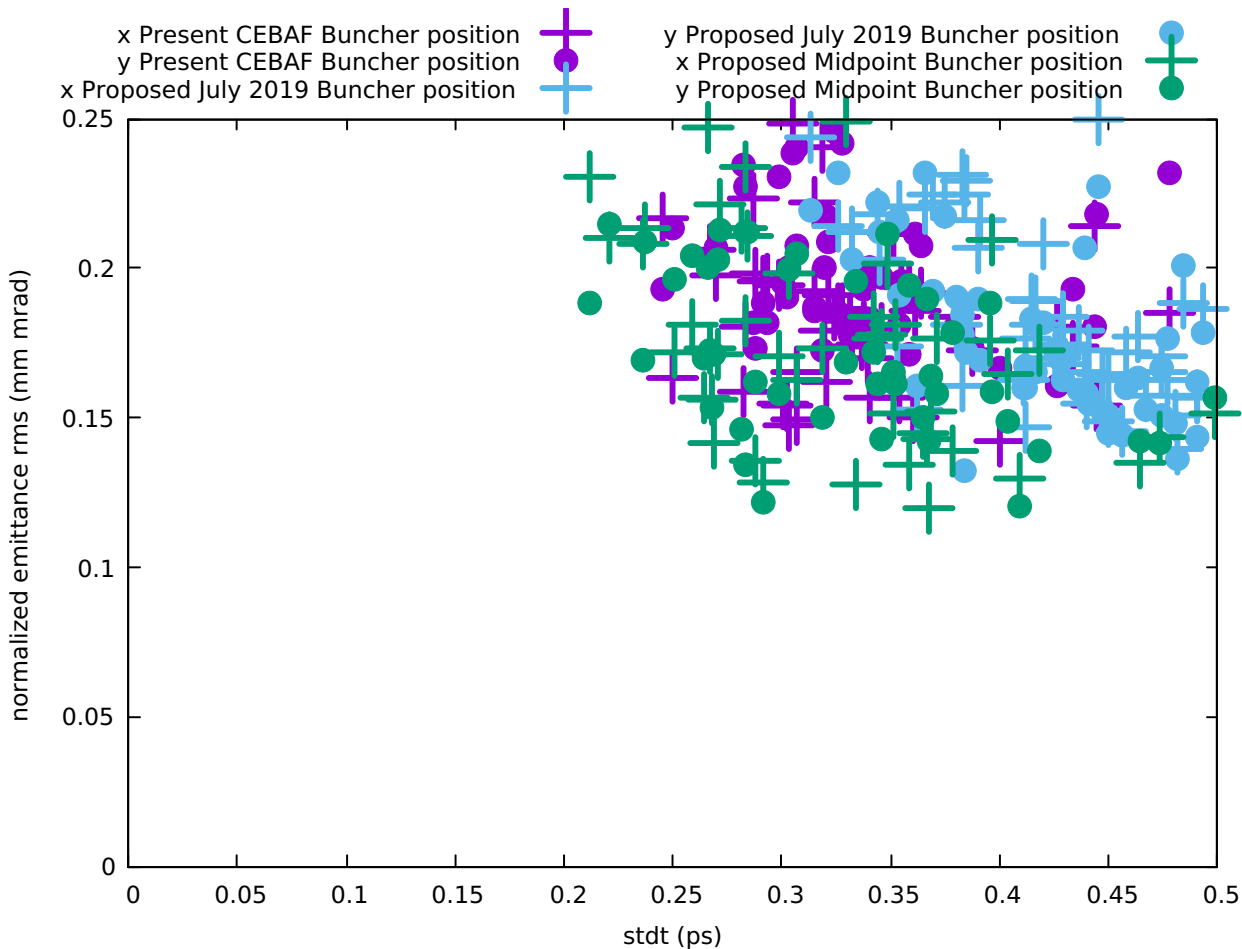
The logo for the U.S. Department of Energy, featuring a circular seal with a shield and a lamp, followed by the text "U.S. DEPARTMENT OF ENERGY".
Office of Science

The logo for JSA, featuring a stylized red and black graphic of a particle detector or accelerator component to the left of the text "JSA".

Model

- Gun to Choppers
 - Proposed layout for Upgrade
 - Prebuncher position shifted downstream of Wiens (not modeled)
 - FAs just upstream and downstream of choppers shifted to new positions away from choppers
- Chopper exit to Booster
 - Three layouts
 - Present CEBAF position
 - Buncher (8.88 m from gun)
 - MFA0I06 and MFL0I07 after Buncher
 - Capture removed
 - July 18, 2019 position
 - Buncher shifted closer to choppers (9.61 m from gun)
 - MFA0I06 before Buncher
 - MFL0I07 midway between Buncher and 2-cell
 - Midpoint or new position (similar to July 18, 2019)
 - Buncher shifted to midpoint between choppers and 2-cell of booster (9.94 m from gun)
- Booster exit to entrance of full module
 - Present CEBAF layout
- Field maps
 - Gun: 200 kV small mushroom 3D field map
 - x: -0.006 m to +0.006 m
 - y: -0.006 m to +0.006 m
 - z: start -0.0642 m, extent 0.1350 m
 - Prebuncher and Buncher from CEBAF model
 - Booster
 - 2-cell
 - 7-cell
 - Solenoids
 - FB and FGs from CEBAF model
 - Jay's solenoid design for remainder (including FDs)
- Omitted elements:
 - 15 degree bend
 - Chopper system
 - Wiens

Optimization fronts

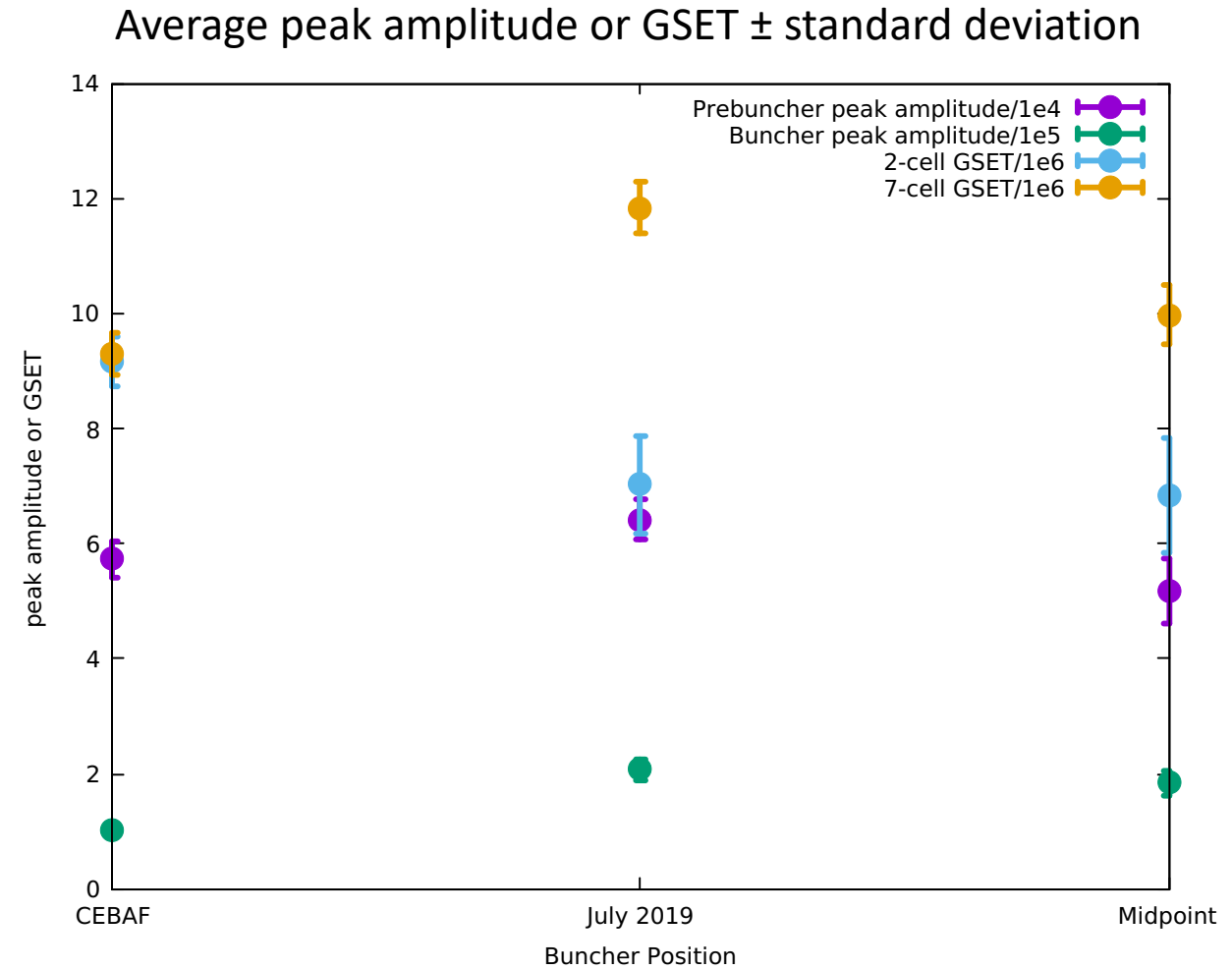
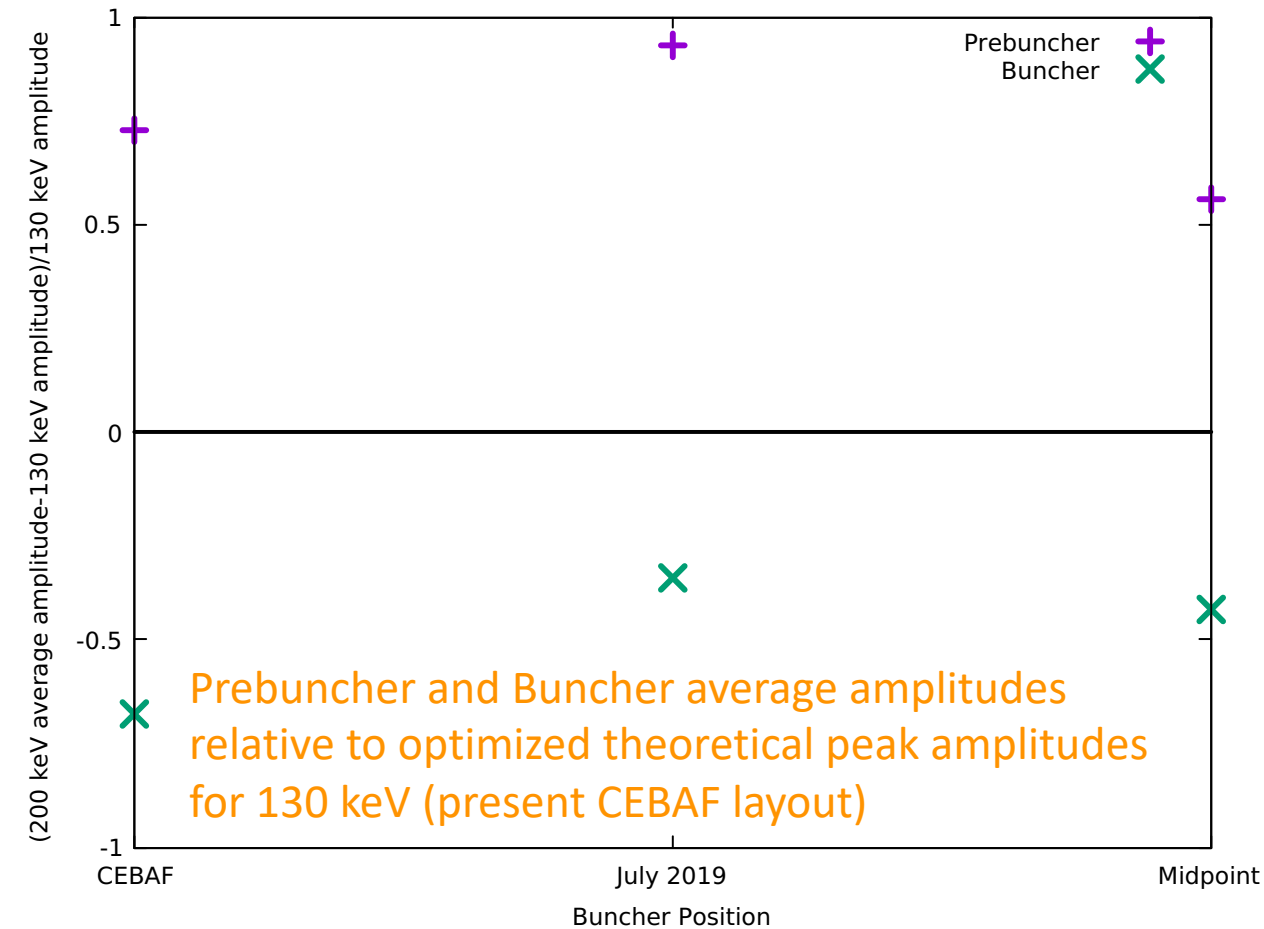


CEBAF buncher position (8.88 m from cathode)

July 2019 buncher position (9.61 m from cathode)

Midpoint or new buncher position (9.94 m from cathode)

RF Settings (average peak amplitudes or GSETs)



CEBAF buncher position (8.88 m from cathode)

July 2019 buncher position (9.61 m from cathode)

Midpoint or new buncher position (9.94 m from cathode)

Preliminary Conclusions

- Based on the optimization fronts
 - All three buncher positions are candidates
 - Ranking of buncher positions
 1. Midpoint or new buncher position (9.94 m from cathode)
 2. CEBAF buncher position (8.88 m from cathode)
 3. July 2019 buncher position (9.61 m from cathode)
- In progress/To do
 - Examine individual solutions to see beam characteristic evolution along beam line
 - To determine if buncher positions have ancillary benefits or disadvantages
 - Identify representative solutions
 - Back out phasing information (relative to crest/zero crossing)