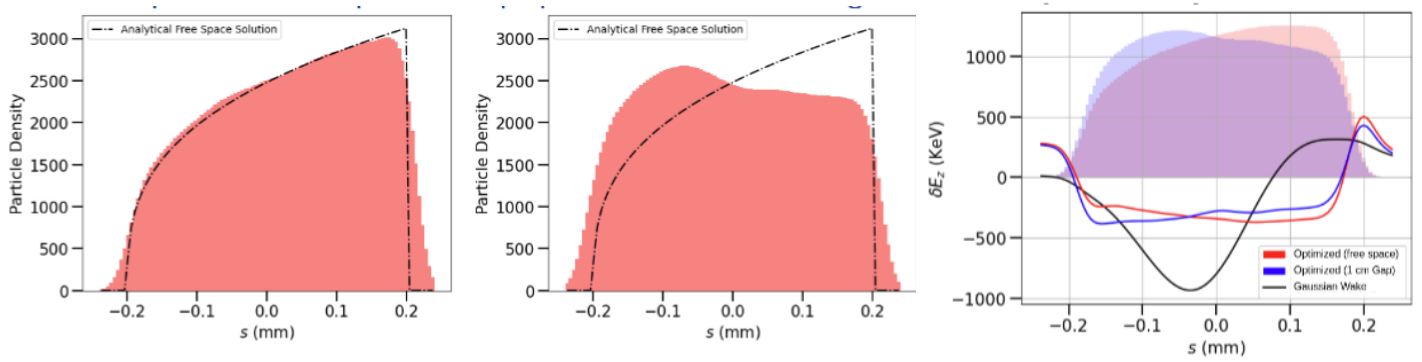
C7 Update- October 2025

- Progress/Immediate plans in SWFA linac design:
  - Scaled existing X-band structures
    - May need to operate in K-band or Ka-band for 1 GW peak power extraction and >300 MV/m geometrical acceleration gradient (based on AWA drive beam parameters)=> small beam aperture
  - Understand available drive beam parameters to the SWFA arm
  - Wakefield studies, tolerance studies, lattice simulations (synergy with SWFA design for 10 TeV)

- Potential synergy with plasma linac design:
  - Dipoles, especially in later stages, may induce significant emittance growth
  - Understanding of coherent synchrotron radiation in complex beams (e.g. longitudinal shaped beams, flat beams out of damping rings) with shielding effects (code being developed by Dr. Omkar Ramachandran)
    - e.g. bunch shape optimization to balance wakefield excitation and CSR mitigation



Left: Free space, optimized profile agrees with free-space analytical solution
Middle: 1 cm shielding gap in the dipole chamber; optimized profile differs from free-space analytical solution
Right: On-axis energy change from CSR in Gaussian and optimized bunches