LP simulations using input from M3D-C1

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M3D-C1 simulation in 3D:

- 0.66 mm radius, pure-neon pellet was injected radially into DIII-D with velocity of 179.5 m/s (parameters provided by D. Shiraki).
- The ablated material is deposited in an axisymmetric annulus centered on the pellet with a Gaussian half width 20x the pellet radius (changes over time).

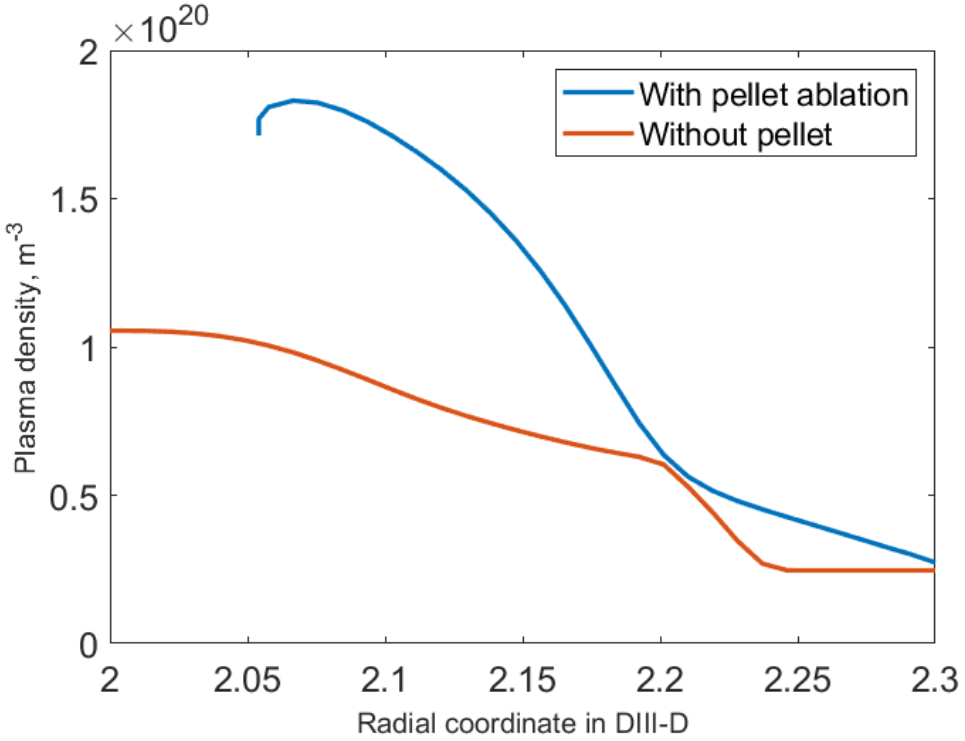
Lagrangian Particle simulation:

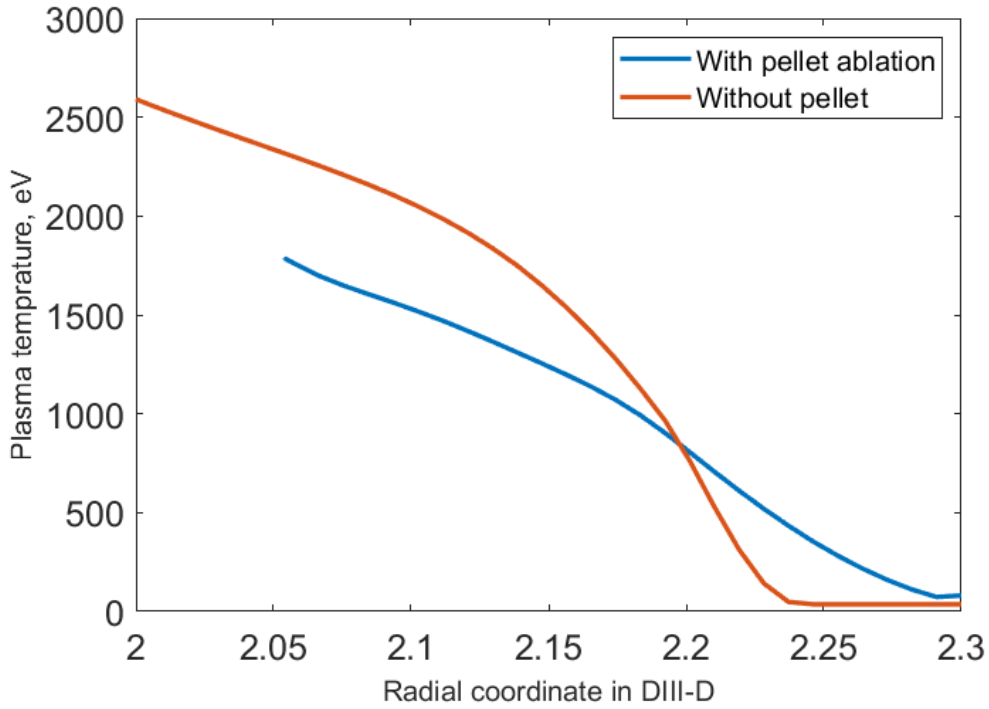
- Using ne(t), Te(t), B(t) near the ablating pellet, we performed LP simulations and compared ablation rates with M3d-C1
- Two LP simulations:

  (1) using states along the pellet trajectory obtained from M3D-C1 pellet ablation output data by averaging within 10 am radius disks around the ablating pellet

  (2) using states along the predicted pellet trajectory obtained from M3D-C1 initial plasma state before the pellet ablation

Plasma States along the pellet trajectory



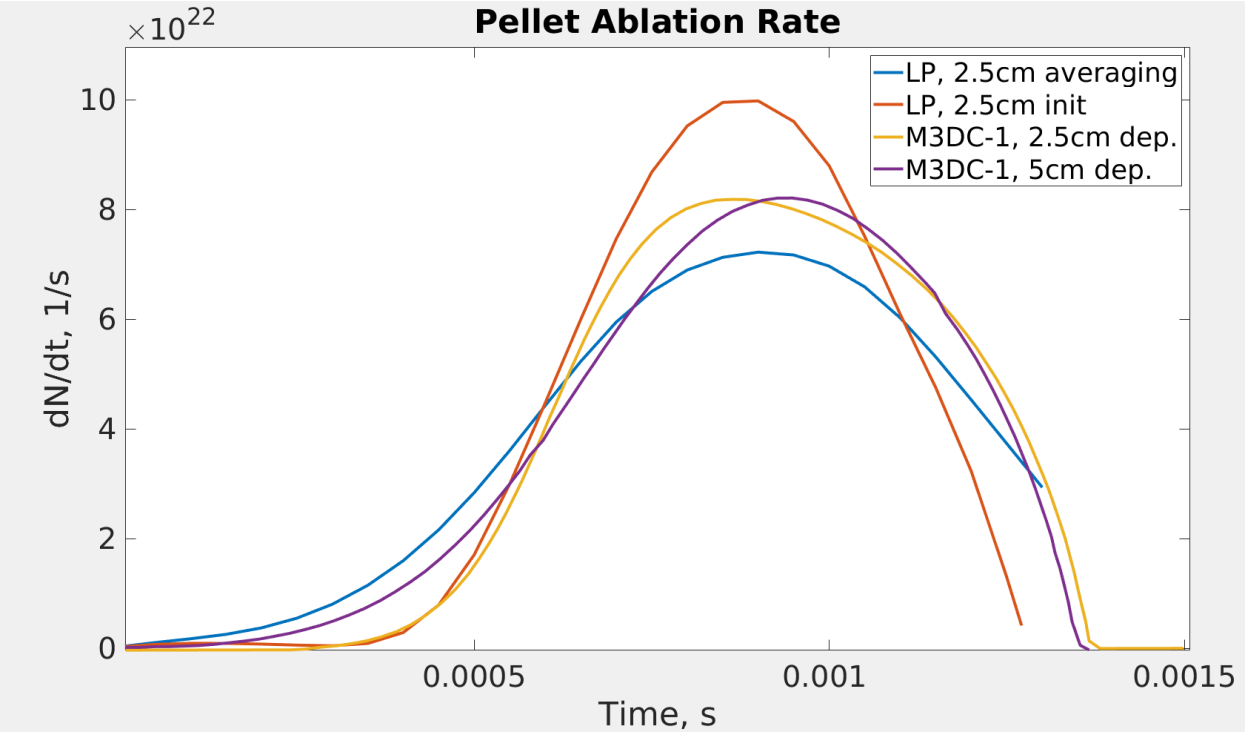


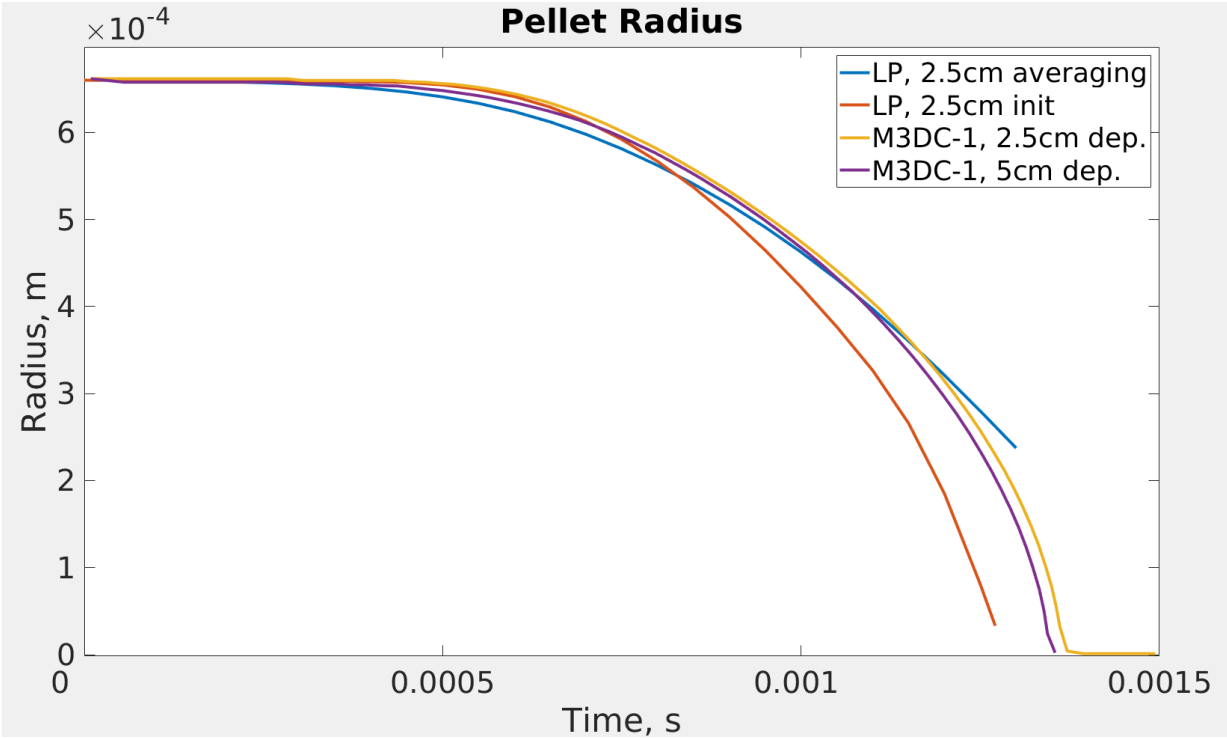
Density (left) and temperature (right) in plasma along the pellet trajectory.

Blue line: states along the pellet trajectory were obtained from M3D-C1 pellet ablation output data by averaging within 10 am radius disks around the ablating pellet. Averaging in larger disks to reduce the ablated material influence is not possible as the states become very noisy / unphysical

Orange line: states along the predicted pellet trajectory were obtained from M3D-C1 initial plasma state before the pellet ablation

Comparison of ablation rates and pellet radii in M3D-C1 and LP codes





Blue line: LP simulation using states along the pellet trajectory obtained from M3D-C1 pellet ablation output data by averaging within 10 am radius disks around the ablating pellet.

Orange line: LP simulation using states along the predicted pellet trajectory obtained from M3D-C1 initial plasma state before the pellet ablation

Yellow and purple lines: M3D-C1 simulations