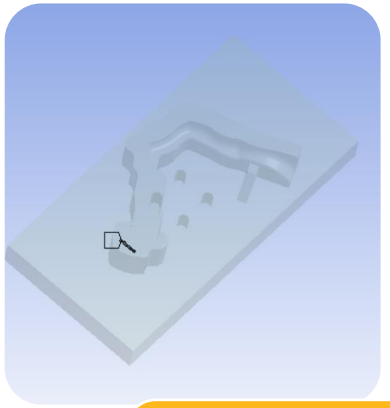
Release 2022 R1 Highlights
Additive Solutions

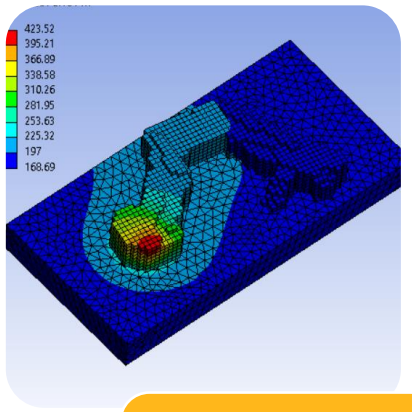
Directed Energy Deposition (DED) Simulation

- Process simulation in Mechanical Workbench for Directed energy process (DED)
- Predict the macro-level temperature-level distortions and stresses in parts to prevent build failures and provide trend data for improving designs for additive manufacturing including part orientation and part build order.



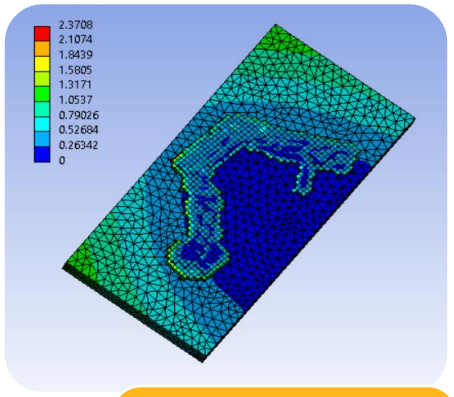
Welds (Element clustering) generation

- Manual approach
- G-Code approach



Transient thermal analysis

- Thermal history
- Process parameters, e.g. deposition rate



Static structural analysis

- Stresses, strains, distortions
- Cutoff

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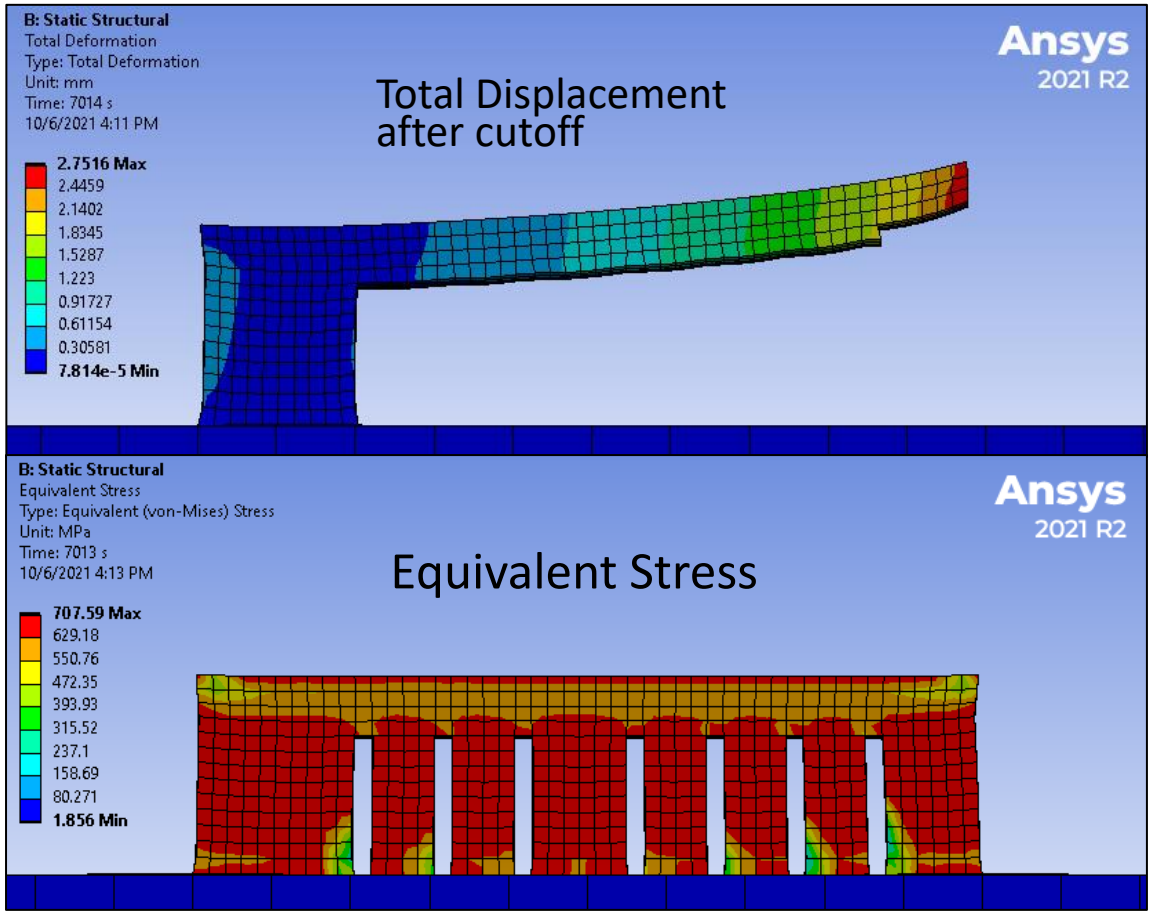
Improved Simplified Heat Treatment (Relaxation Temperature)

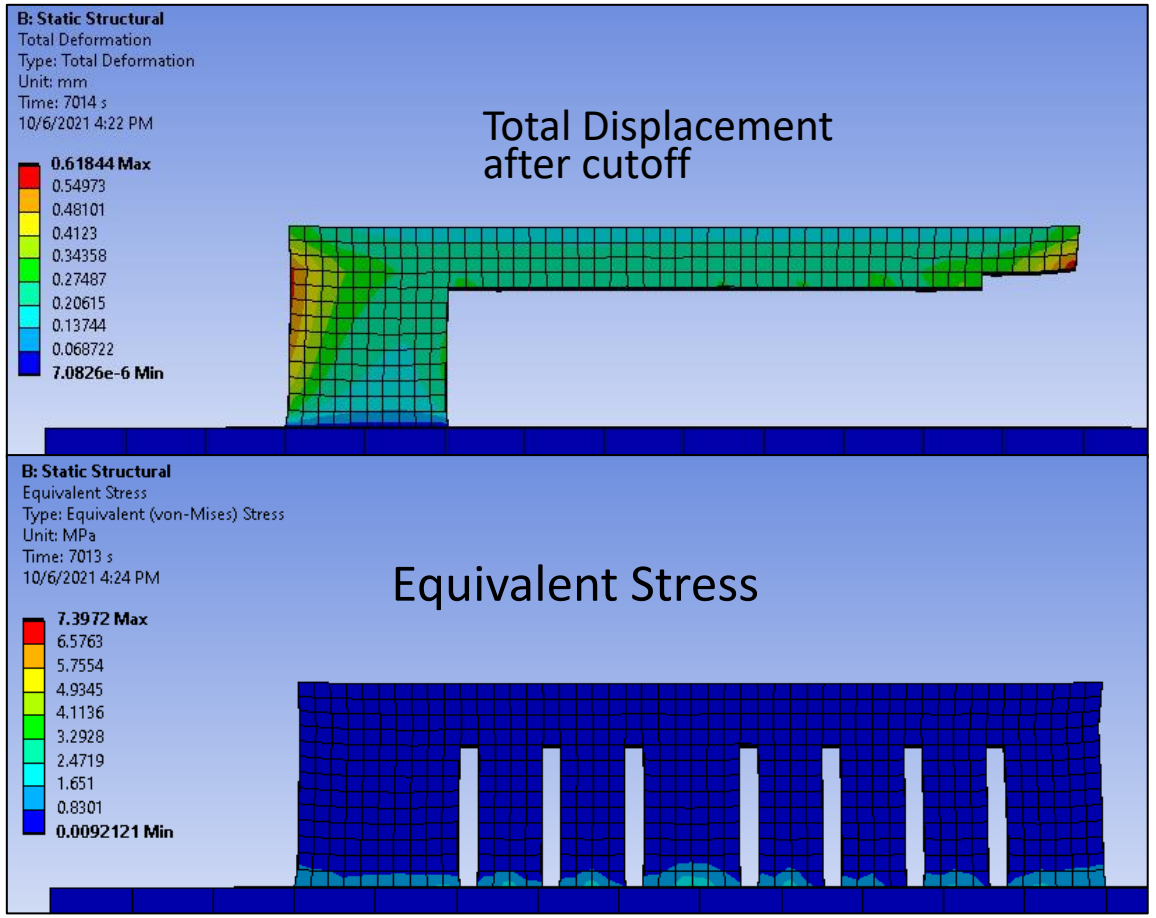
- Zero out only plastic strain
- No heat treatment for base plate

2021 R2



- Zero out elastic strain, plastic strain, stress
- Heat treatment for base plate

2022 R1



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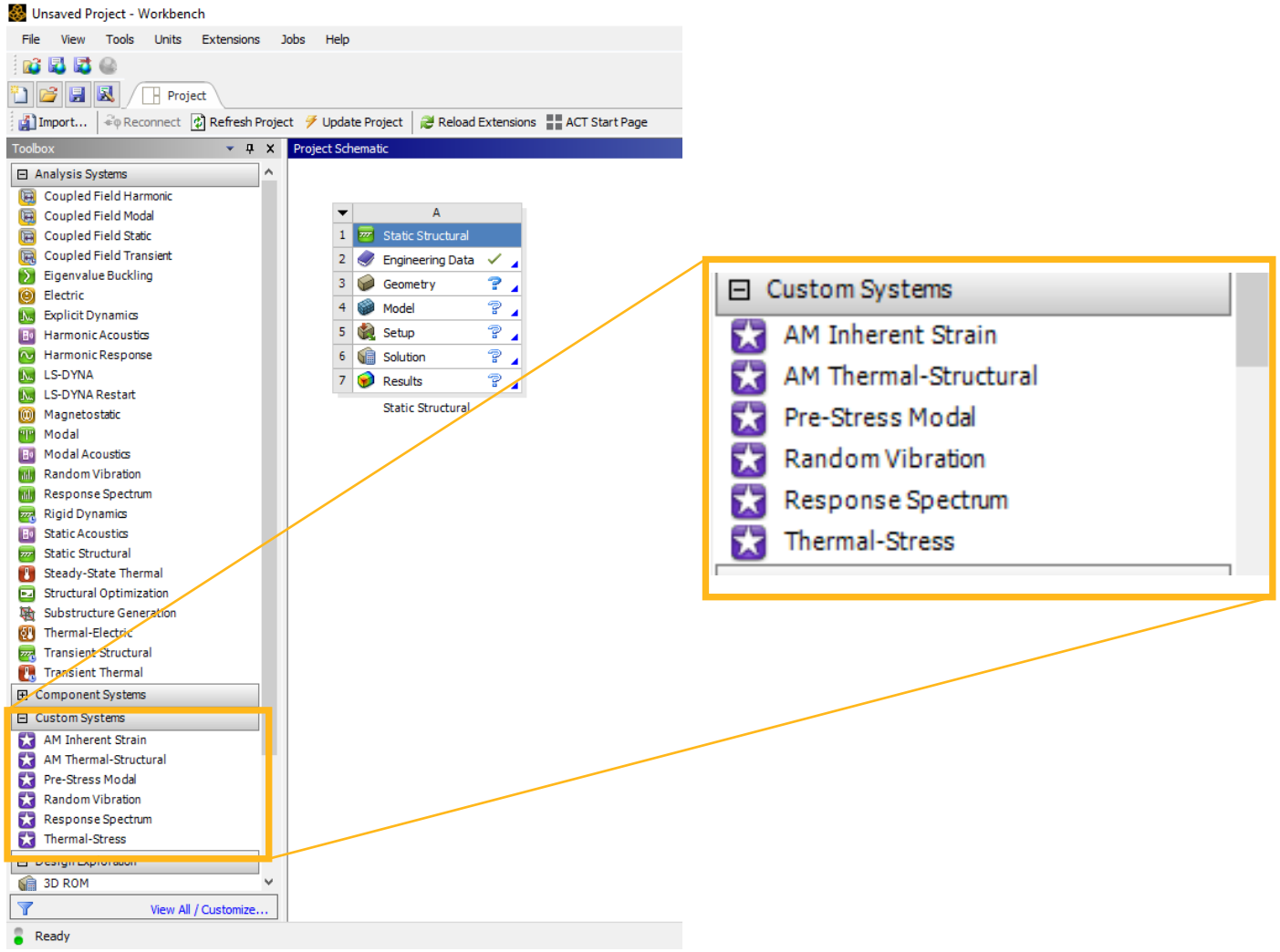
Custom Additive Manufacturing (AM) Analysis Systems

- New Custom Systems for Inherent Strain and Thermal Structural Analyses

- Custom systems automatically load AM sample materials and adds AM Process object in Mechanical



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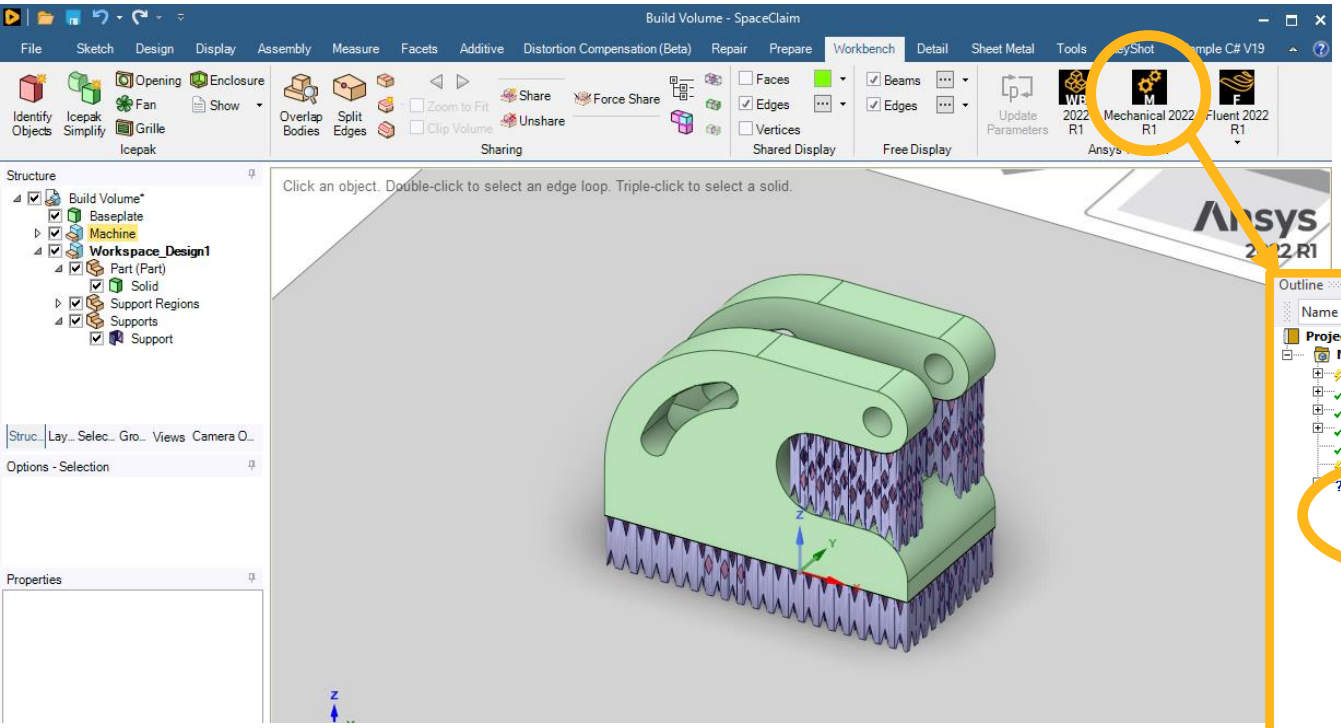
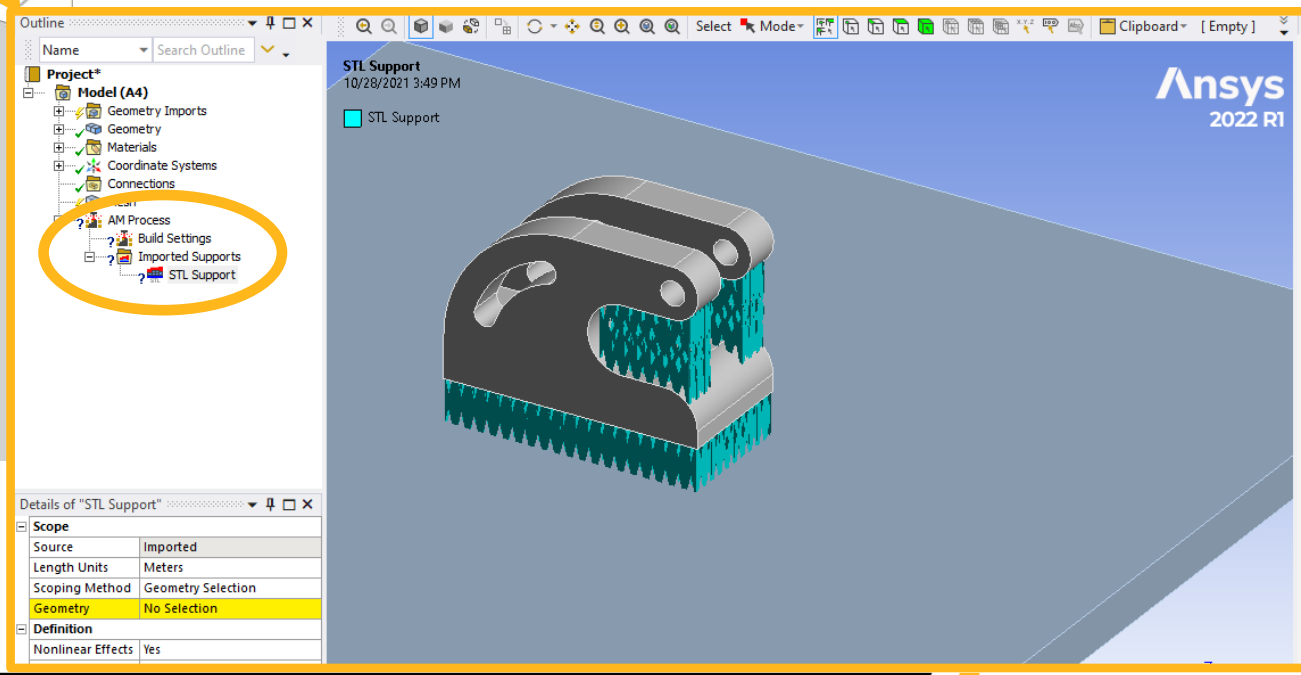
Transfer from Additive Prep to Workbench/Mechanical

- Smoother transfer of supports from Additive Prep to Workbench/Mechanical
  - Mechanical and Workbench buttons in SpaceClaim transfer and auto-populate supports from Prep





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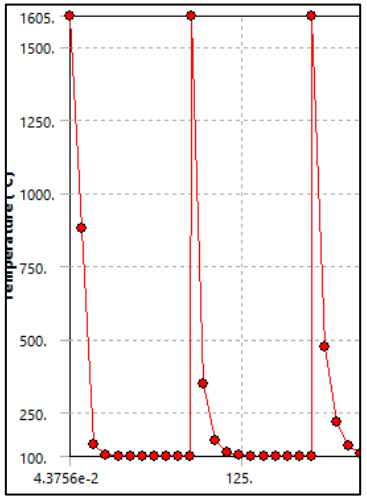
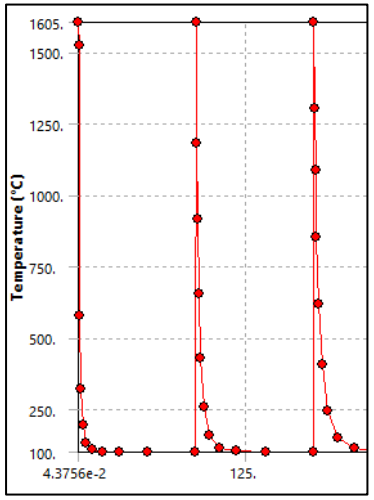
Minor Improvements

- Additive Wizard
  - Now available in Linux
  - Option to toggle nonlinear properties
- MAPDL
  - Improved bisection helps convergence in some models
  - Variable layer height setup – additional flag to avoid error in ambuild command no longer needed
  - Option to add time bias factor when cooling between layers (amstep,build,,,,,,biasFactor)

biasFactor = 1



biasFactor = 1.7



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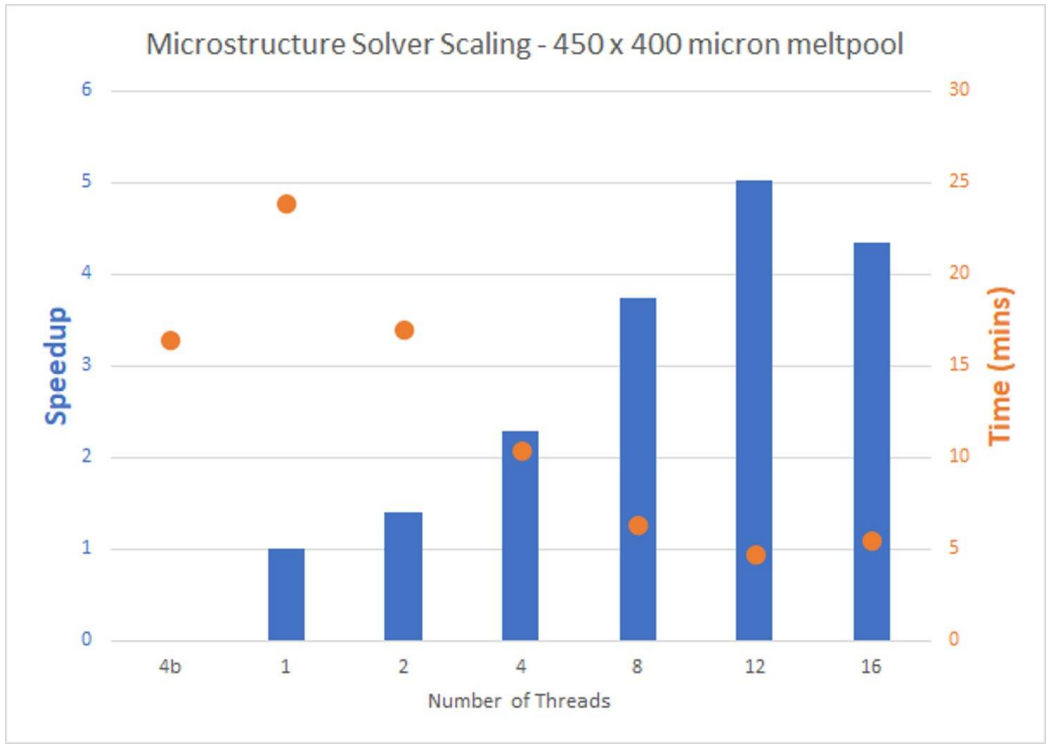
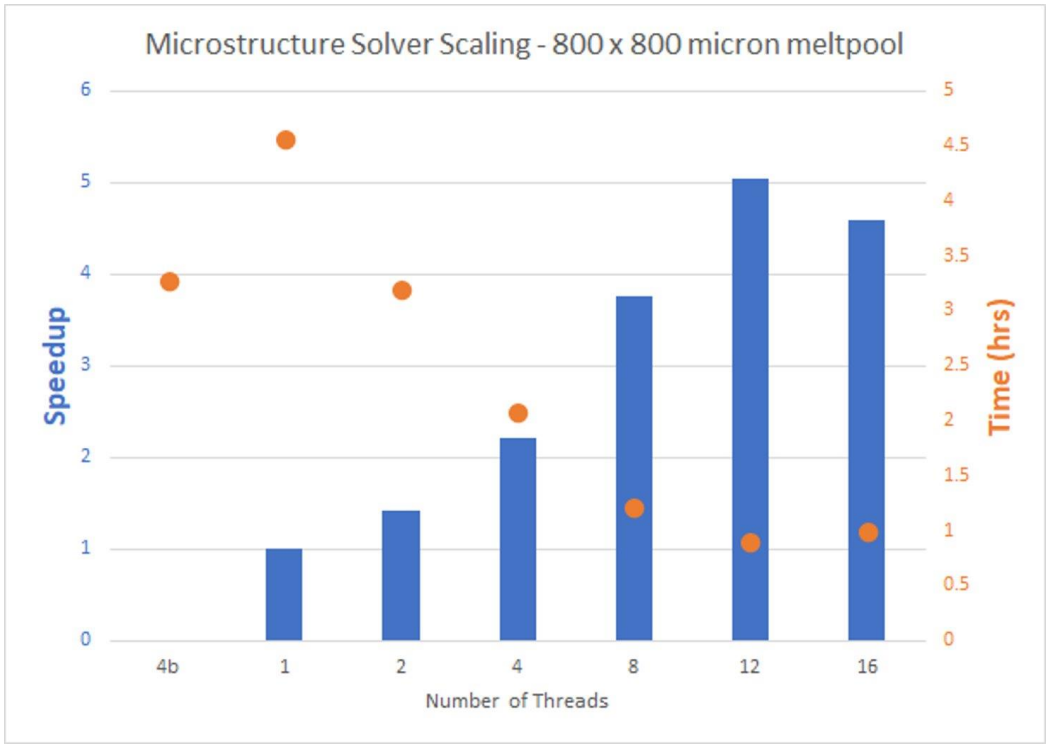
Parallelization: 2D Microstructure Solver in Science

- Fully threaded all the core component of the solver
- Significant speed up observed

Microstructure Solver Performance





*12-core PC machine

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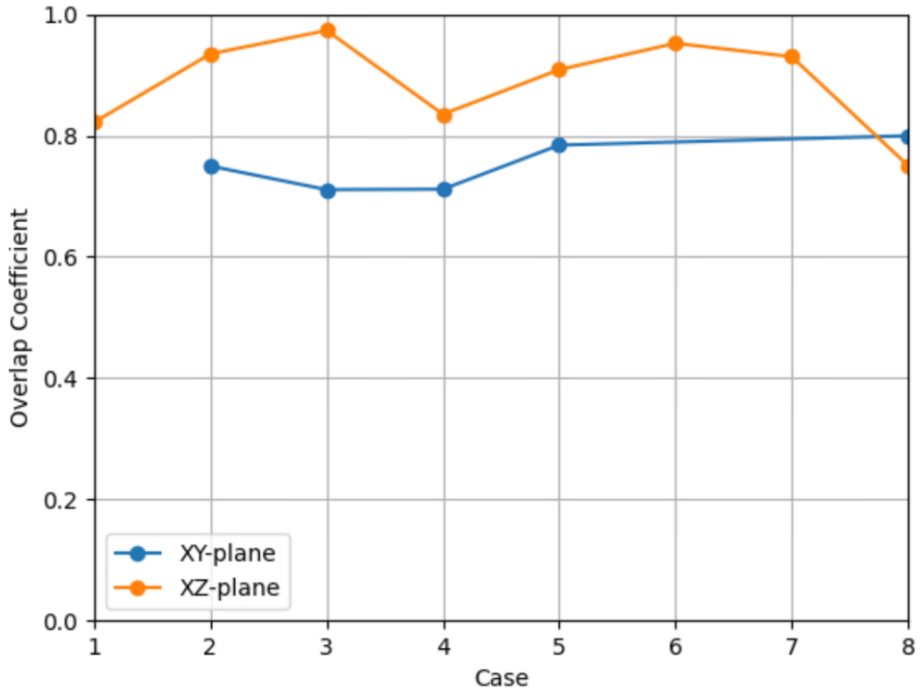
17-4PH in Additive Science

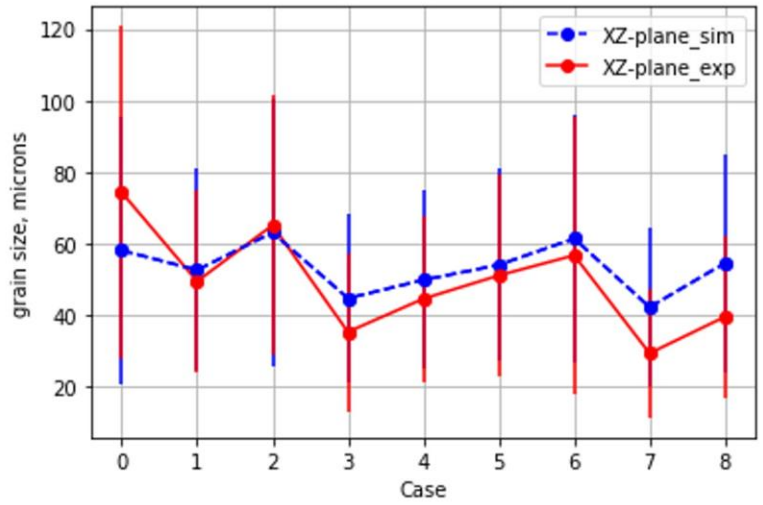
- Validated and added as a new material

Similarity comparison metric for Vertical and Top plane

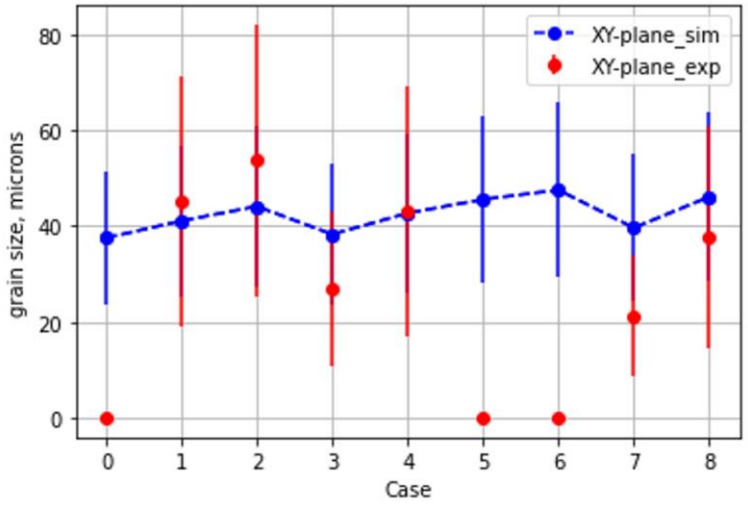


- Overlap coefficient of all the data points are above the 0.6 (minimum value to qualify)

Grain size comparison: Vertical plane



Grain size comparison: Top plane



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