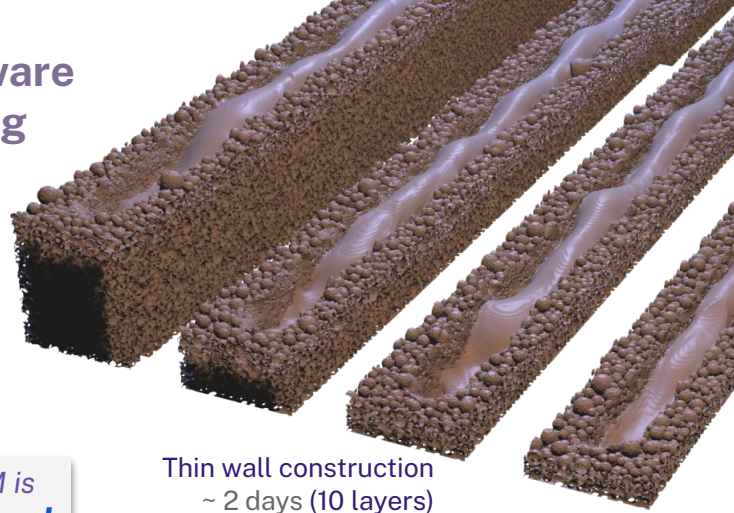




# KiSSAM Simulation Software for Additive Manufacturing

KiSSAM is a state-of-the-art modeling tool designed specifically for melt pool modeling in additive manufacturing. With its advanced fluid dynamics code, KiSSAM accurately reproduces track morphology and accounts for all relevant surface effects on a fine mesh. This software supports modeling of heat deposition for electron beam and laser sources, as well as simulating heat transfer through models of radiation, convection, and evaporation.

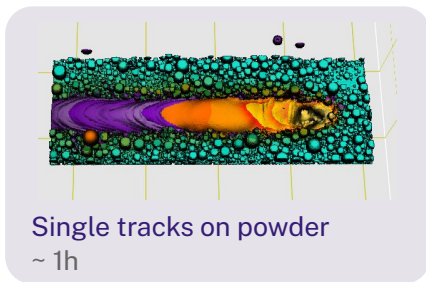
The web interface for KiSSAM is available at [www.kissam.cloud](http://www.kissam.cloud)



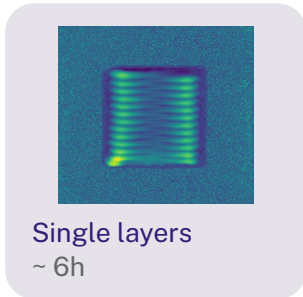
Thin wall construction  
~ 2 days (10 layers)

## WHY MESOSCALE?

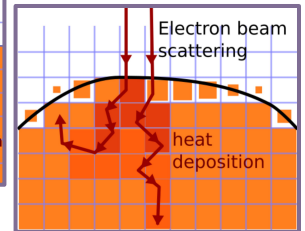
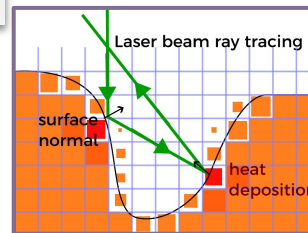
- Identify scanning regime defects: balling, keyholing, etc.
- Inspect melted sample morphology: roughness, porosity.
- Virtually build overhangs, thin walls, fine structures.
- Get temperature history, portion of absorbed energy.



Single tracks on powder  
~ 1h



Single layers  
~ 6h



## HIGH PERFORMANCE

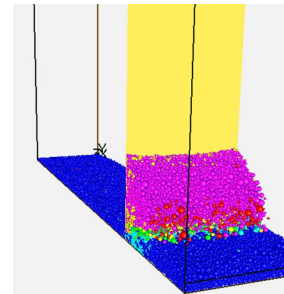
KiSSAM runs at high-performance on desktop workstations with at least one high-end GPU, enabling:

- Simulate in full 3D
- Resolve small powder particles, sintering and pores on a fine mesh
- 0.5–1 hr of simulation per 1 ms scanning time
- Multi-layer simulations
- Get detailed process maps (hundreds of experiments) in a few days

## SIMULATION OF THE WHOLE PROCESS

The software enables simulation of the whole process using a multi-physical model that covers everything from powder deposition to sensor response. It includes:

- grain microstructure formation at the solidification front;
- powder particle and liquid drop movement during fusion;
- self-consistent liquid-gas modeling;
- gas pores formation;
- physics of sensor response.
- accurate material models with temperature dependency of material parameters



## PROVIDES MULTISCALE MODEL FOR LARGE SAMPLES

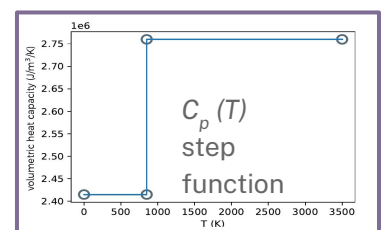
Melt pool is fitted by a fine mesh. Fluid dynamics is simulated in a small region around the melt pool (~ 1 mm).

Heat transfer is simulated in a large domain (~ 1 cm) with adaptive mesh step.

Geometry of the powder and melted metal is stored as fine sparse volumetric data in the whole region (~ 1 cm).

## USER-FRIENDLY EXPERIENCE

- Universal input (JSON, stl, vdb) and output (vdb, vtk, data and image files) data formats.
- Rendering of informative images in the course of modelling.
- Presets for common experiment setups with annotated input files, samples of output data with illustrations and analysis.
- Extendable library of commonly used materials: Inconel 625, Ti6Al4V, AA5182, CoCr, SS316L.
- KiSSAM comes with scripts for result diagnostics.
- Provides even more flexibility with Python control.



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