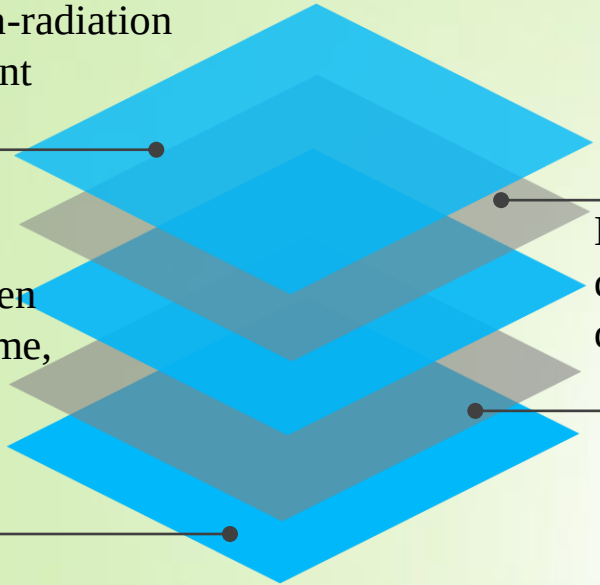
Part 1

Additive Manufaturing

Research Contents

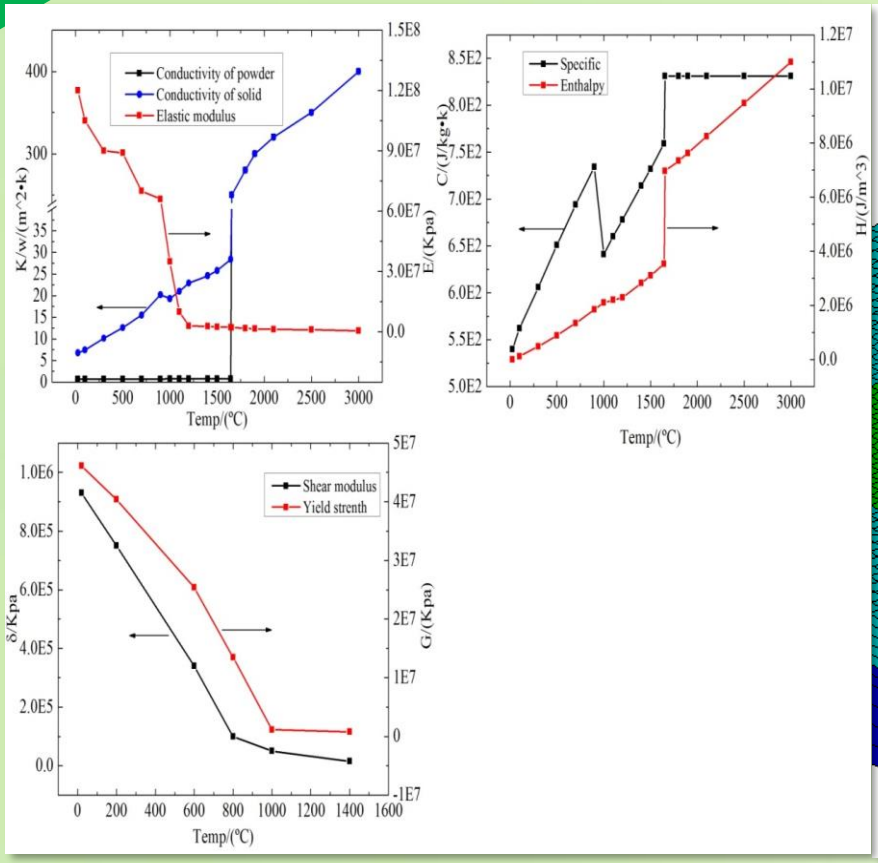
Established a three-dimensional simulation model, determining the nonlinear physical property parameters, and convection-radiation dynamic total heat transfer coefficient

Temperature-stress distribution law in three-dimensional direction

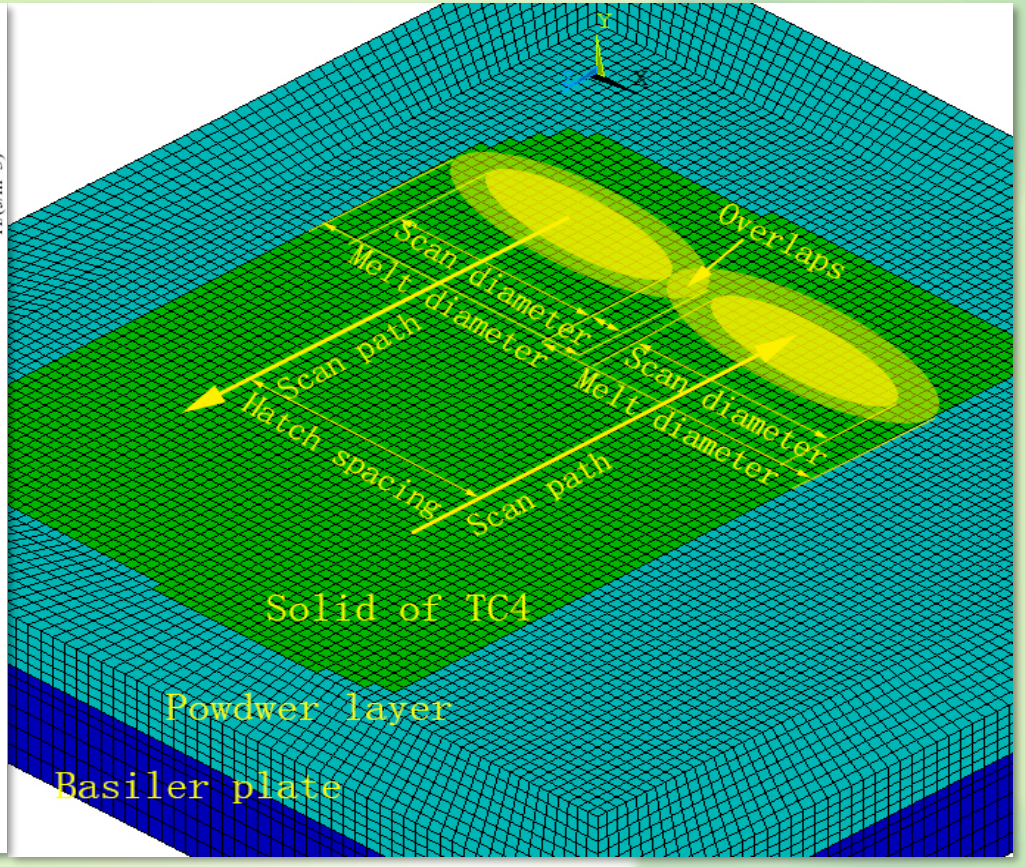


Maximum temperature and stress distribution of welding seam under different laser power and speed

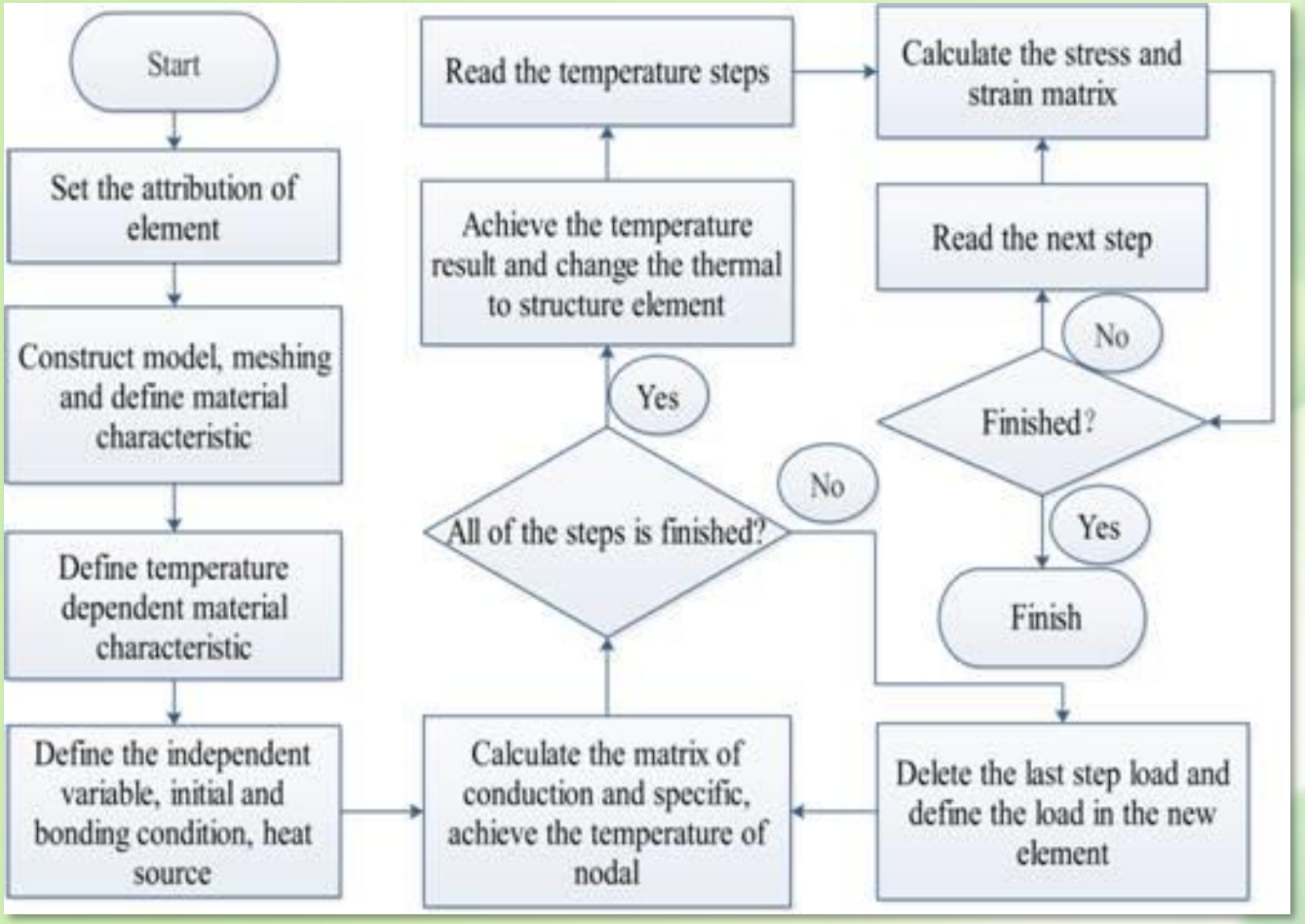
Distribution law of the highest molten pool temperature, molten pool volume, and energy density at different laser powers and speeds



Thermal and mechanical properties of TiAl6V4.



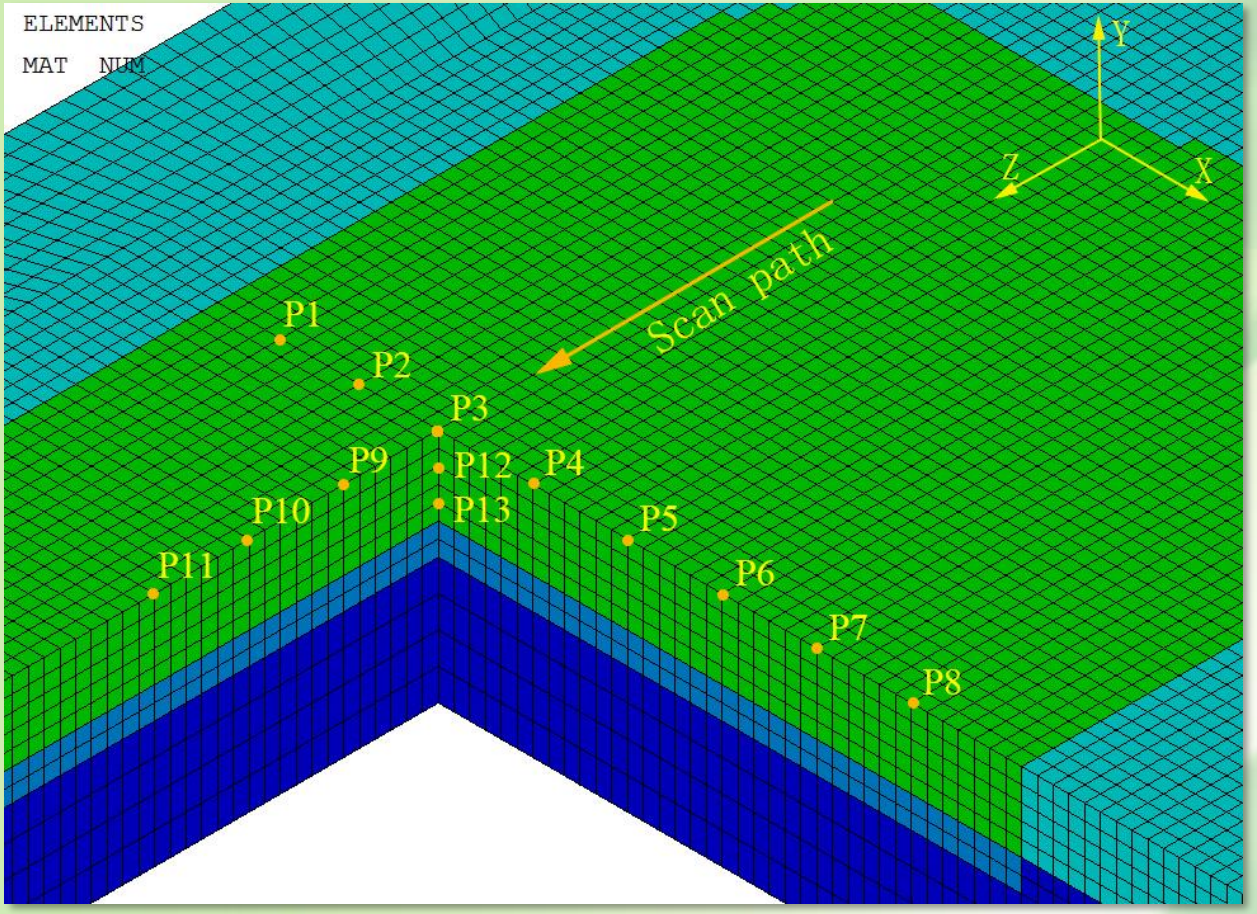
SLM workbench and scanning strategy



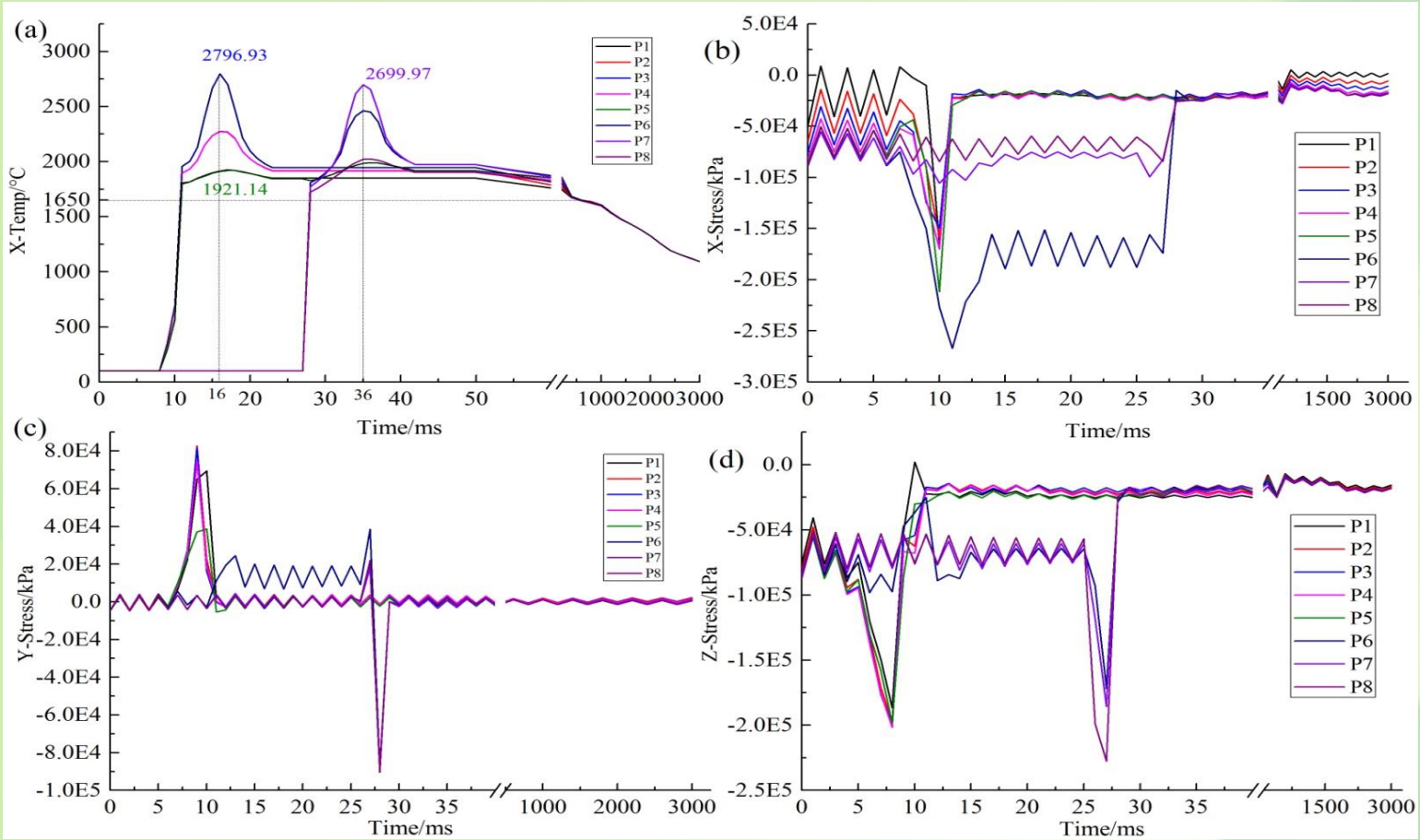
Indirect coupling process of temperature and mechanical analysis

1

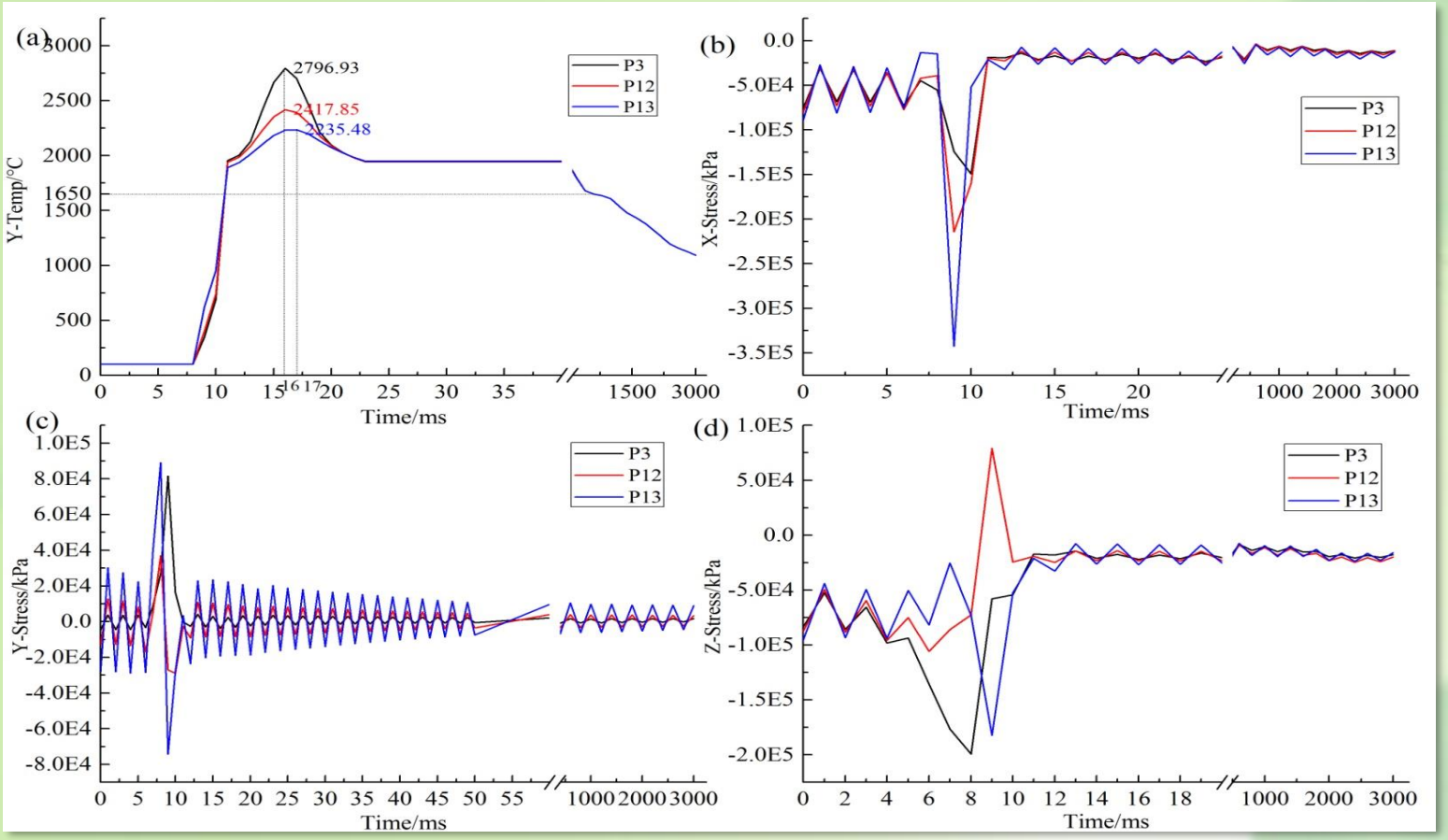
- Temperature distribution characteristics



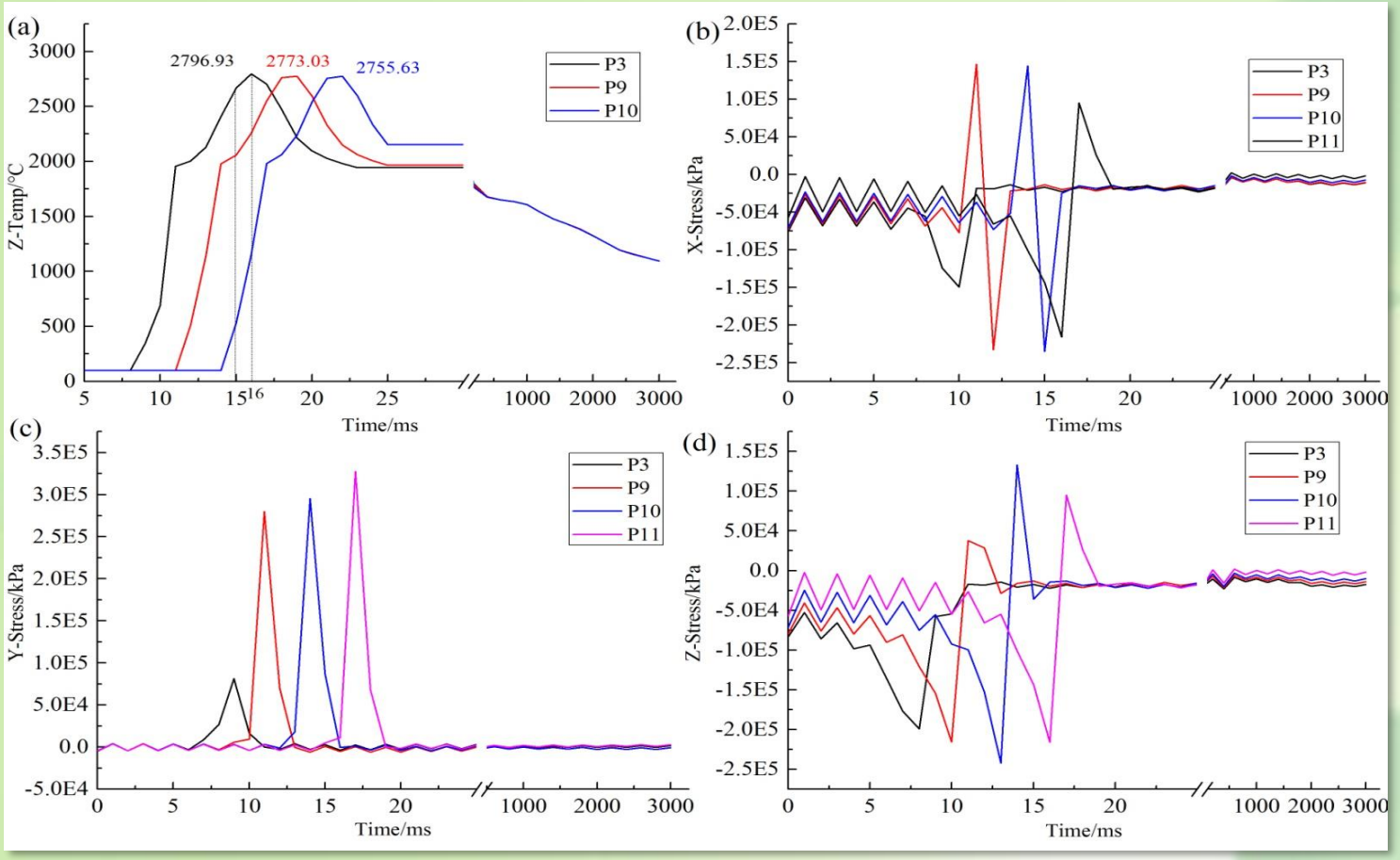
Monitoring points of temperature-stress distribution in 3D model



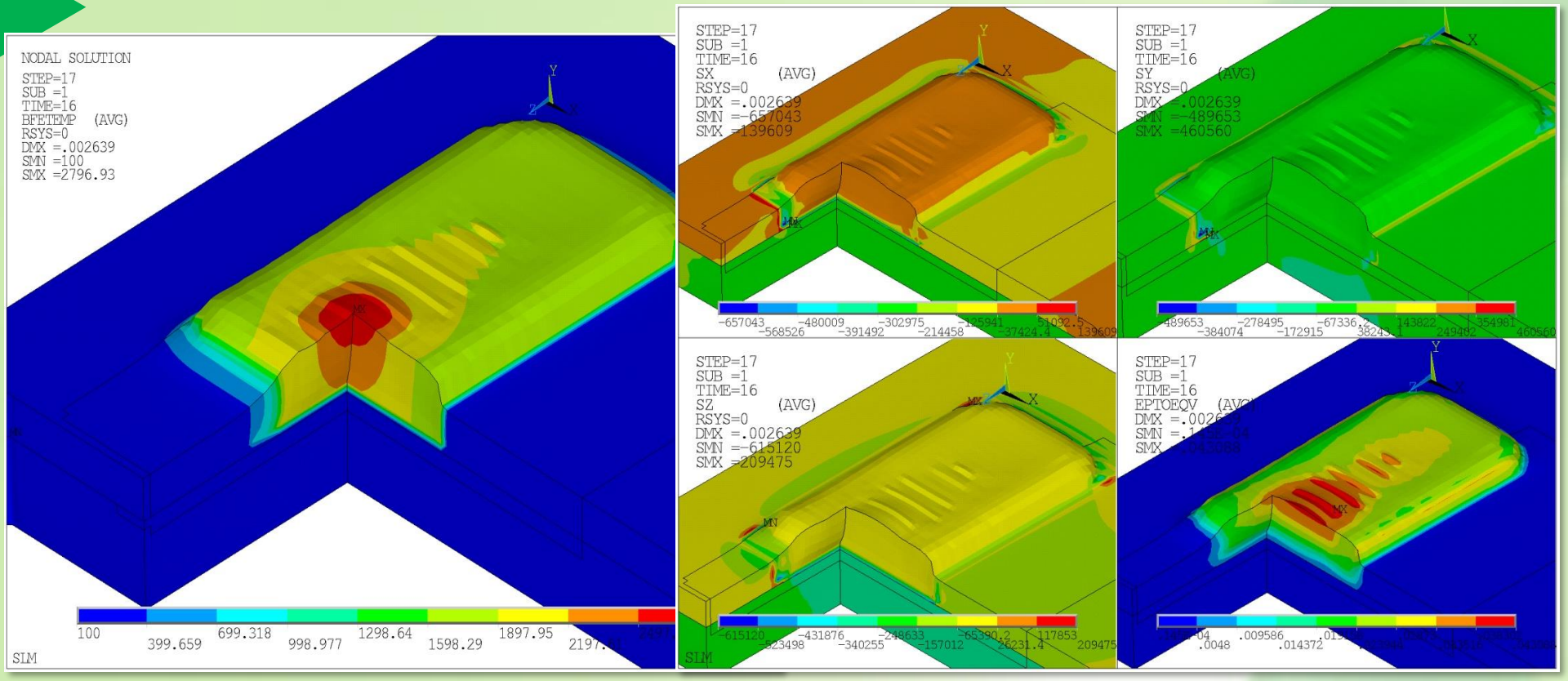
P1-p8 temperature-stress distribution of 3D model



P3,p12,p13 temperature-stress distribution of 3D model.



P3,p9,p10 temperature-stress distribution of 3D model

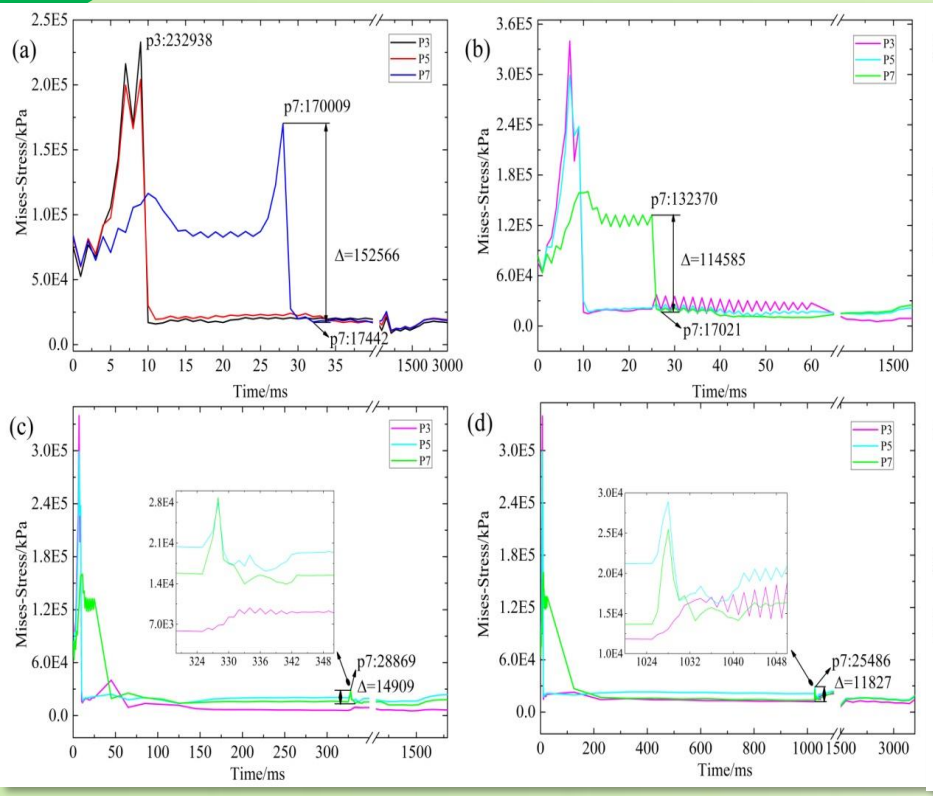


Temperature-stress distribution contour at t=16ms

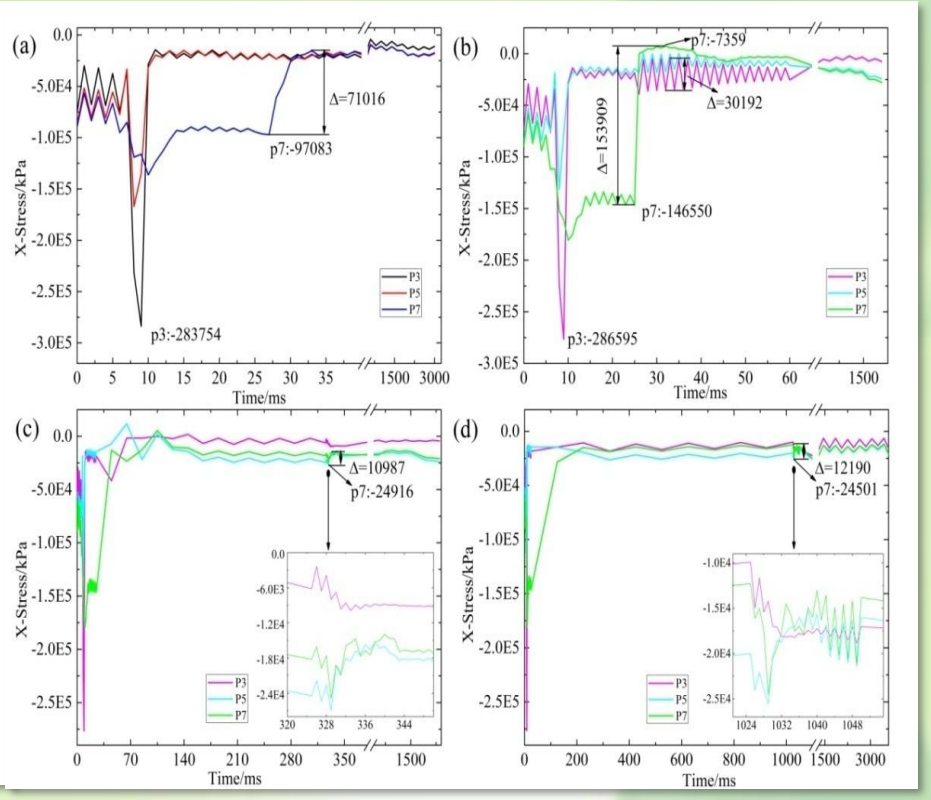
(a)temperature distribution contour, (b) stress distribution contour

2

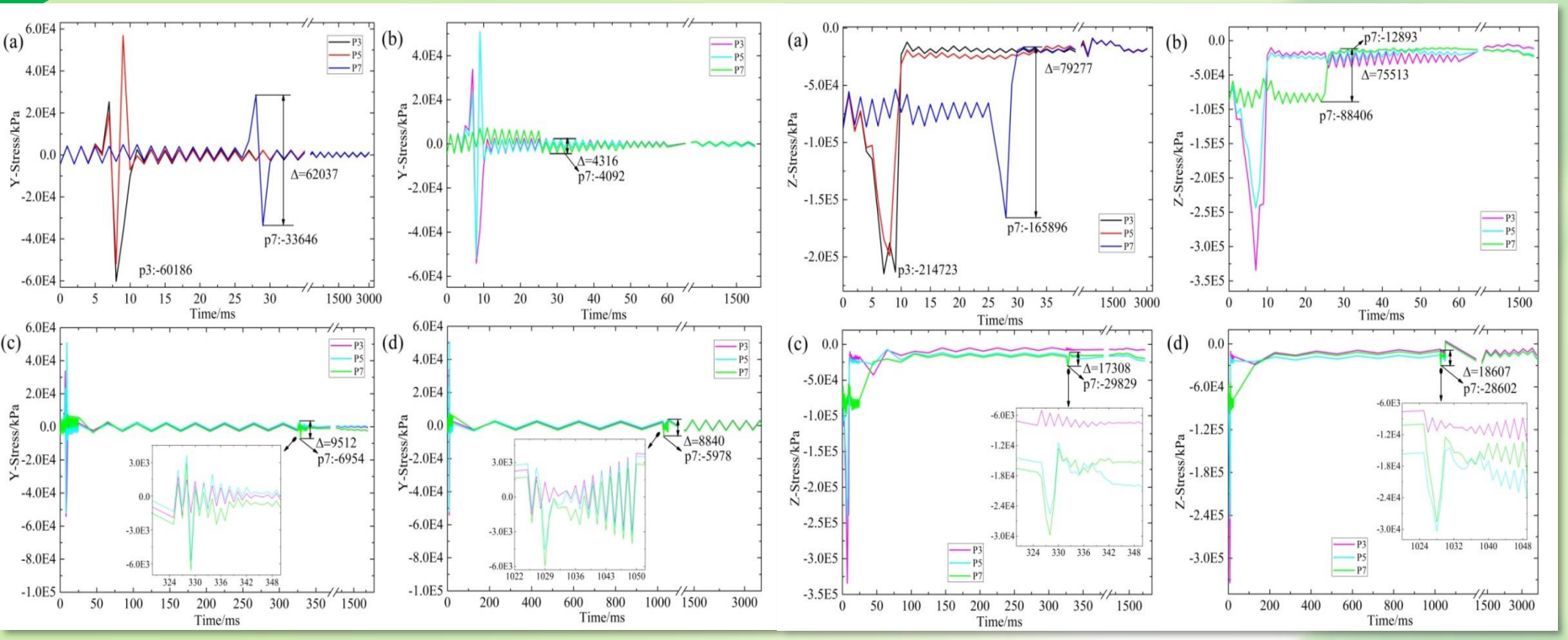
- Distribution law of the highest molten pool temperature, and energy density at different laser powers and speeds



Mises stress distribution of cooling 0, 10,300,1000 ms between scanning tracks



X direction stress distribution of cooling 10ms between scanning tracks

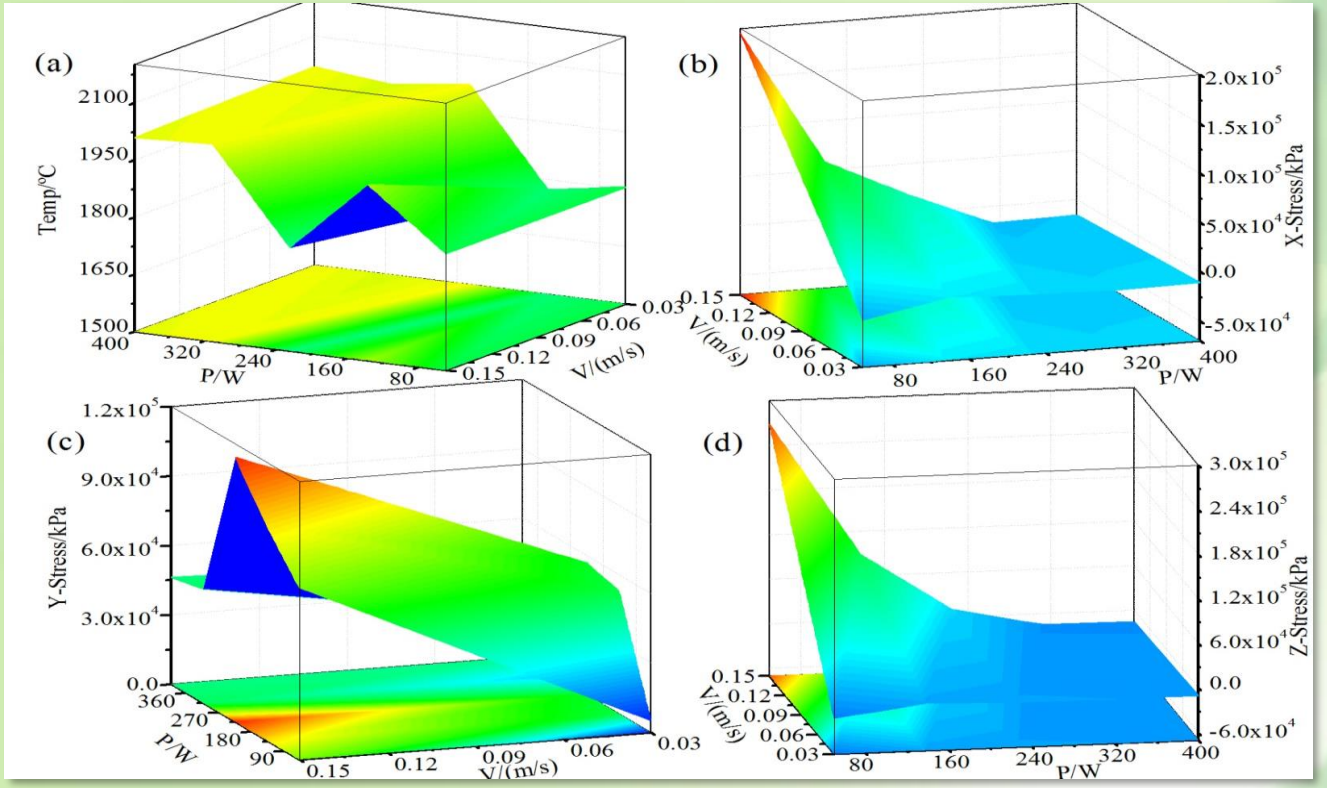


Y direction stress distribution of cooling 300 ms between scanning tracks

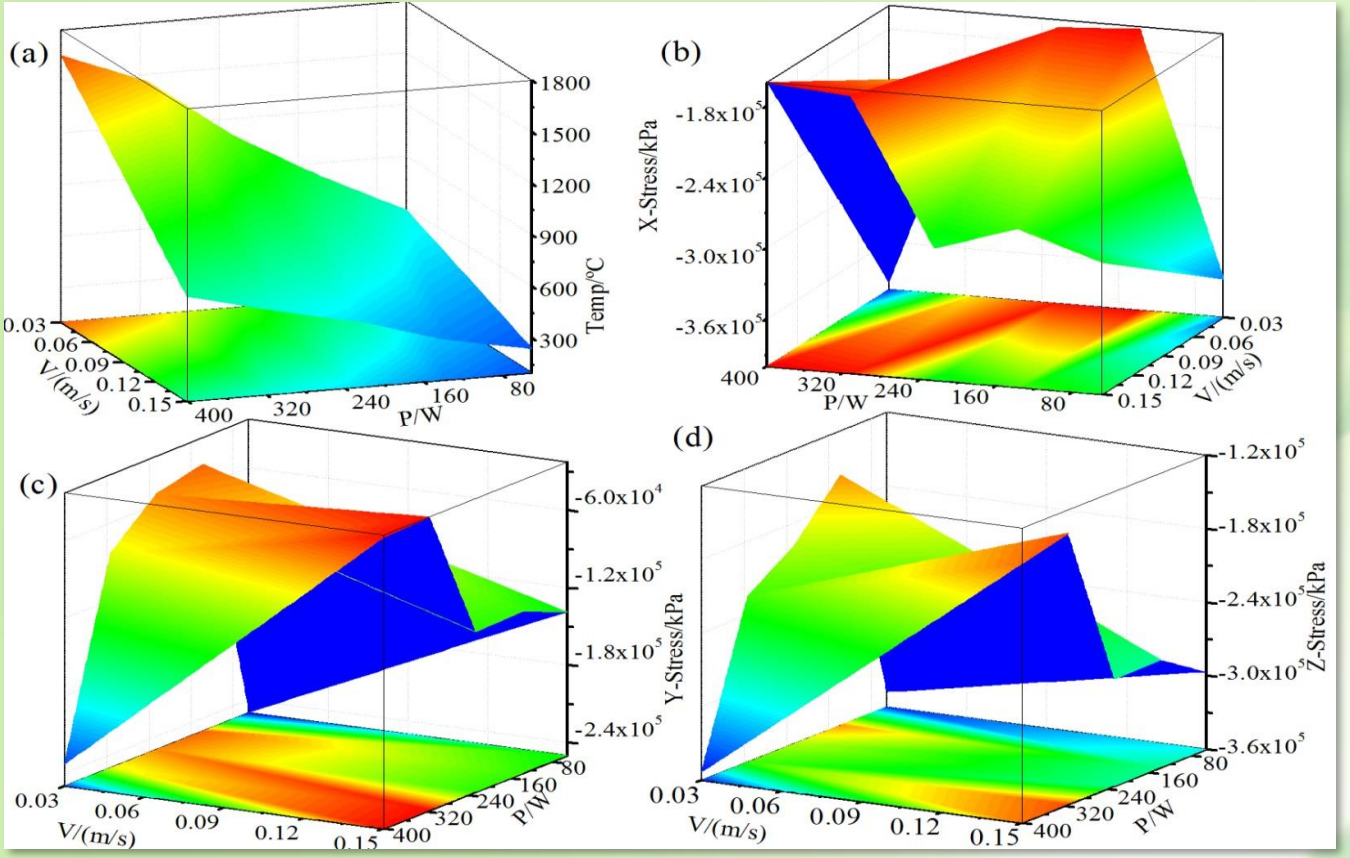
Z direction stress distribution of cooling 1000 ms between scanning tracks

3

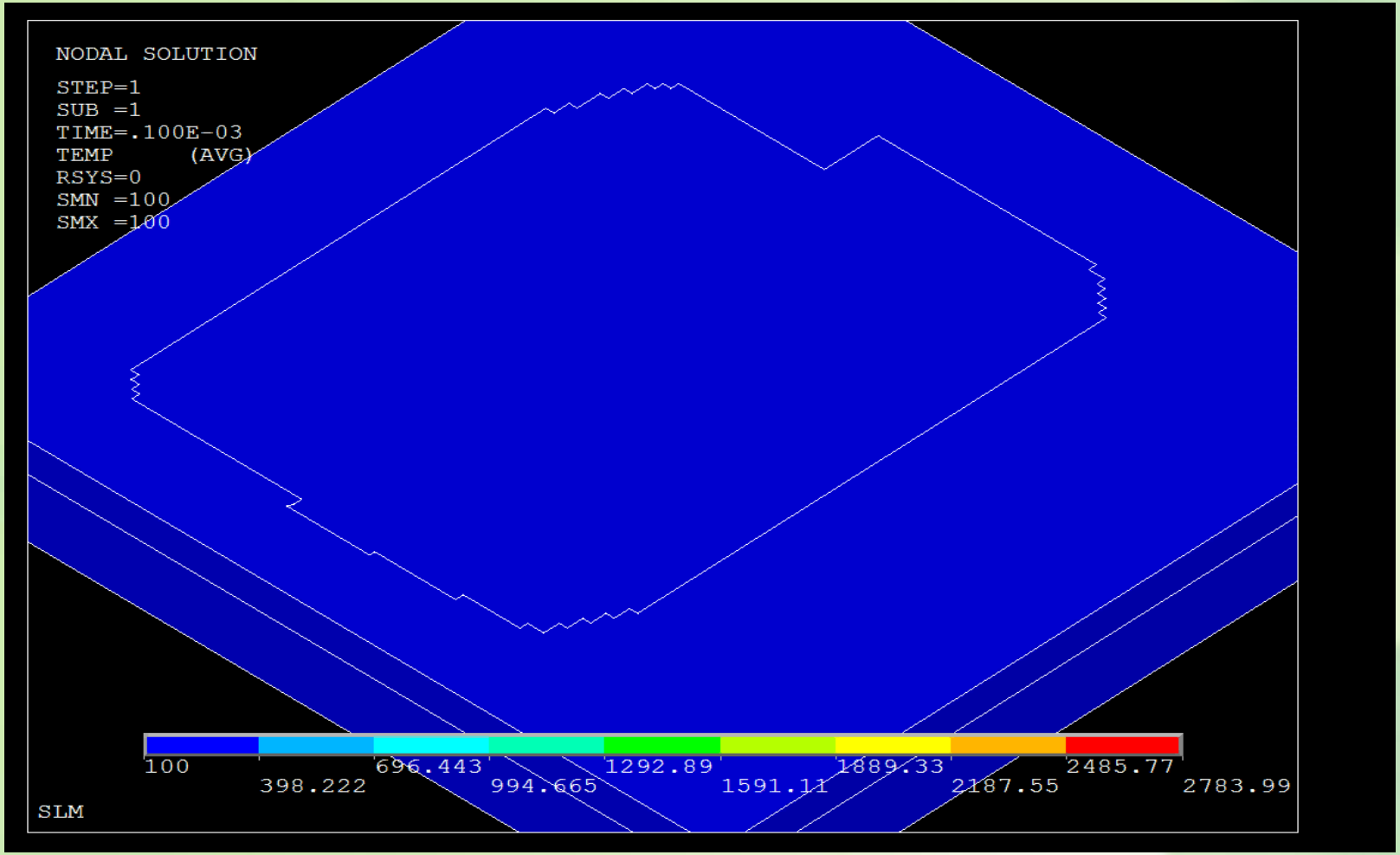
- Maximum temperature and stress distribution of welding seam under different laser power and speed

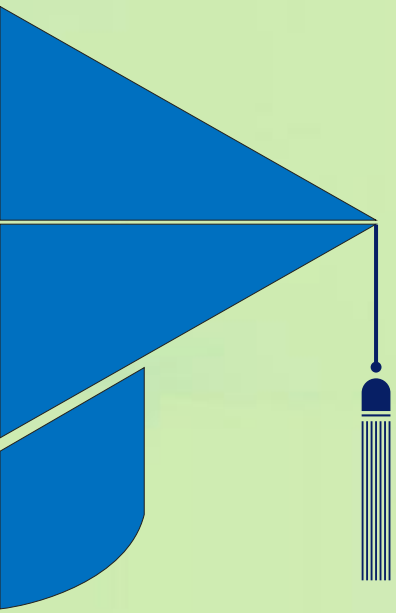


Maximum temperature-stress distribution of melt gap at different laser power and velocity.



Minimum temperature-stress distribution of melt gap at different laser power and velocity.


NODAL SOLUTION
STEP=1
SUB =1
TIME=.100E-03
TEMP (AVG)
RSYS=0
SMN =100
SMX =100
100
398.222
696.443
994.665
1292.89
1591.11
1889.33
2187.55
2485.77
2783.99
SLM



Thank you !