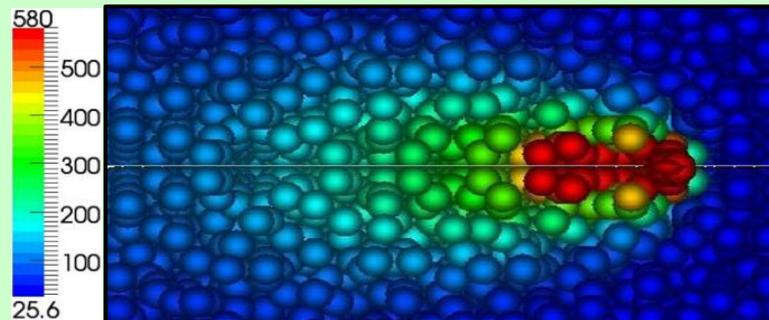


Analyse du bain de fusion lors du soudage laser d'un joint AA6061-T6: Approche (SPH)

Radouane El kinani :

Étudiant au doctorat, UQAR



Encadré par les professeurs :

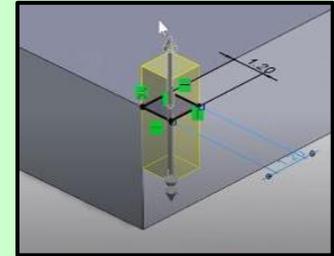
Barka Noureddine et El Ouafi Abderrazak

Département de mathématiques, d'informatique et de génie
Laboratoire de matériaux, produits et procédés de pointe - (LMP3)

Variable d'entrée expérimentale du processus de soudage au laser

Tête Precitec YW52
No wobbling

Laser conventionnal (Precitec head)									
Laser source:	10kW (Trumpf)								
Laser head:	Precitec YW52								
Wobbling type:	No wobbling								
NRC ID	Joint configuration	Laser power (kW)	Travel speed (m/min)	Focal position (mm)	Nominal spot size (mm)	Laser mode	Oscillation amplitude (mm)	Oscillation frequency (Hz)	Laser angle (°)
Precitec conv 1	Overlap	5,50	5,0	10	0,4	Continuous	0,0	0,0	5
Precitec conv 2	Overlap	6,75	6,5	10	0,4	Continuous	0,0	0,0	5
Precitec conv 3	Overlap	8,25	8,0	10	0,4	Continuous	0,0	0,0	5



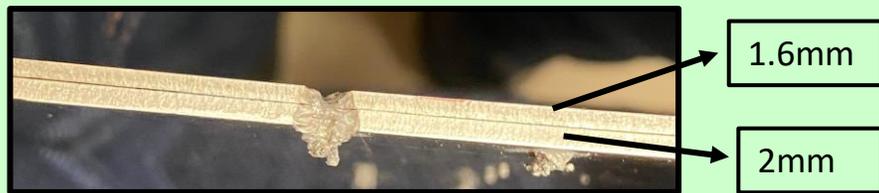
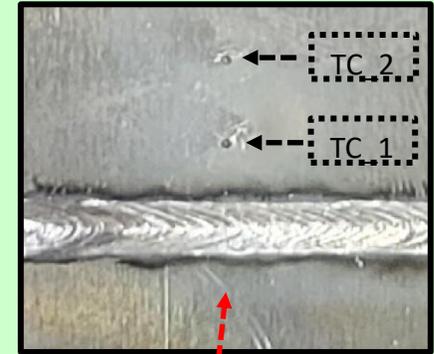
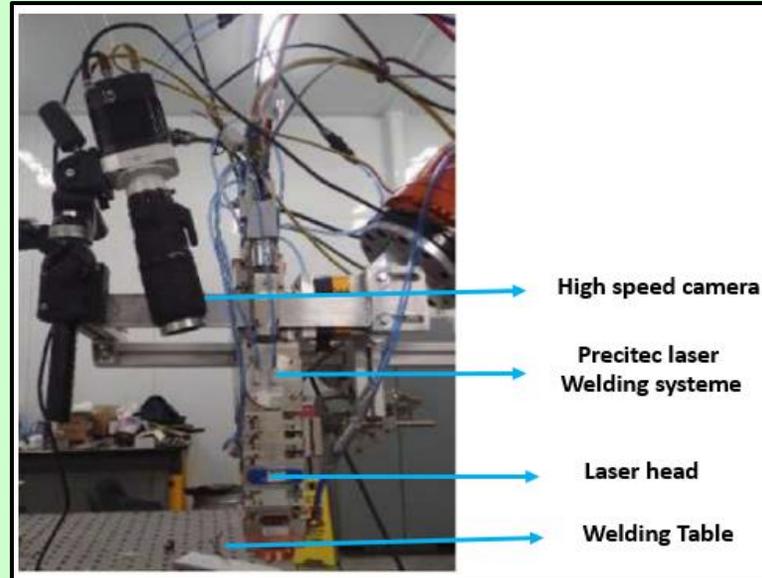
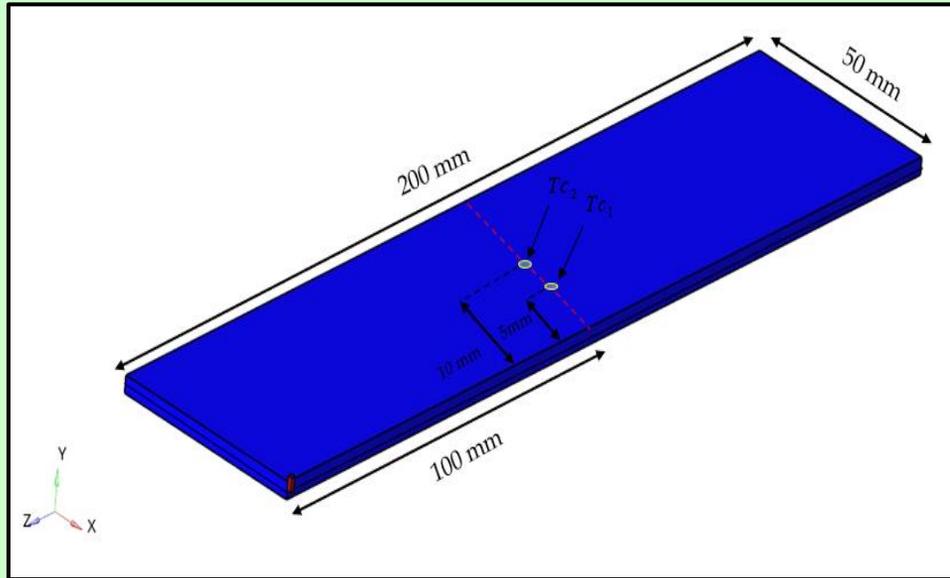
```

$ Rho      Cp      K
 2700.0    860.0    167.0
$ Tinit    Tinf    hconv    Tmelt
 25.6      25.0     500.0    580.0
$ VzLaser  LasrPower  LasrEff  LasrTime
-5000.0    5000.0     0.206    2.4
$ TcPart#   nTC
 3          3
$ xTC1     yTC1     zTC1
 0.020     0.0020   -0.10
$ xTC2     yTC2     zTC2
 0.015     0.0020   -0.10
    
```

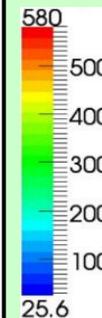
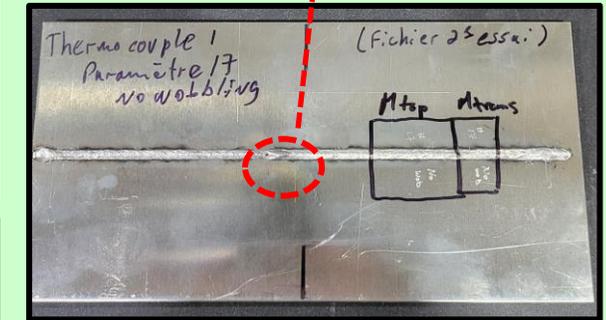
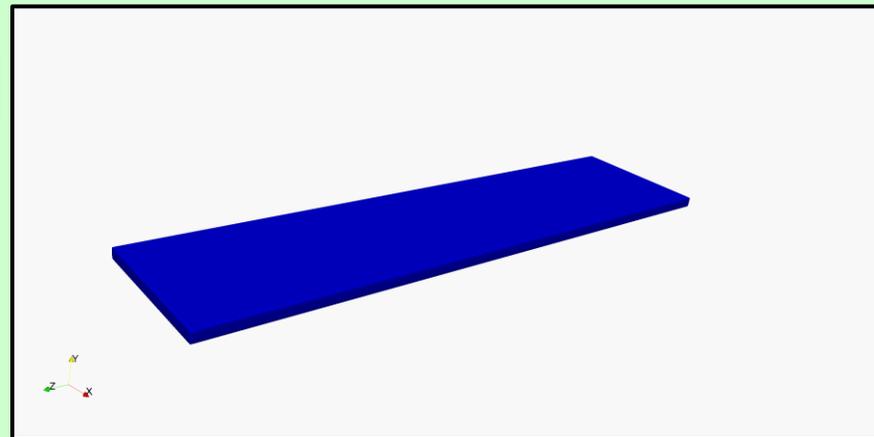
Le fichier d'entrée du code de soudage laser

Modèle de sources de chaleur Precitec

Installation expérimentale de soudage de deux tôles AA6061 dans une configuration de soudage par chevauchement en utilisant le soudage laser Precitec (YW52).

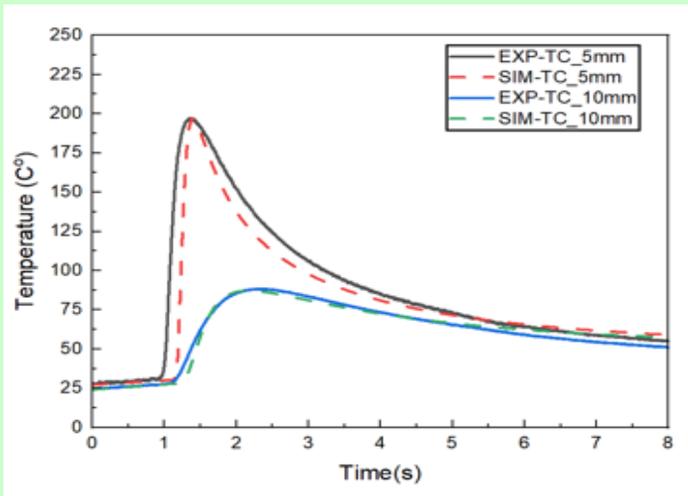


AA6061

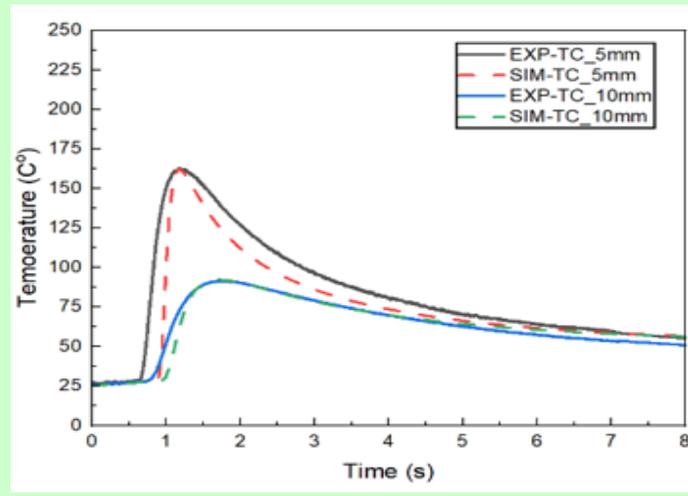


Compatibilité étroite entre les résultats expérimentaux et numériques en divers endroits de l'élément soudé.

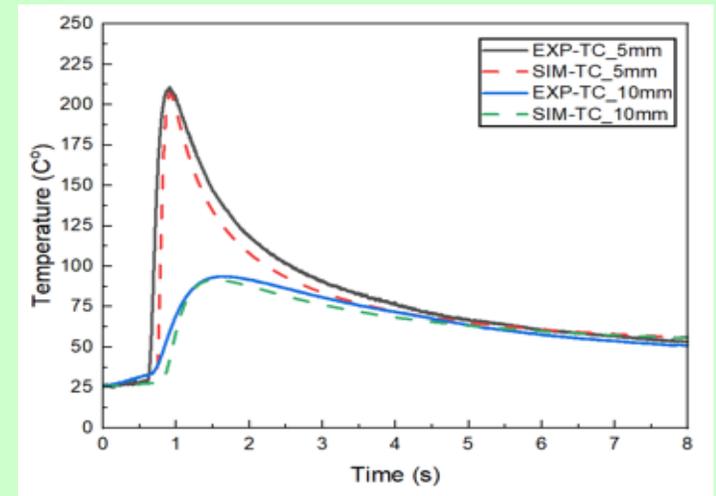
Precitec#1
P=5.5 kW , S=5 m/min
(No wobbling)



Precitec#2
P=6.75 kW , S=6.5 m/min
(No wobbling)

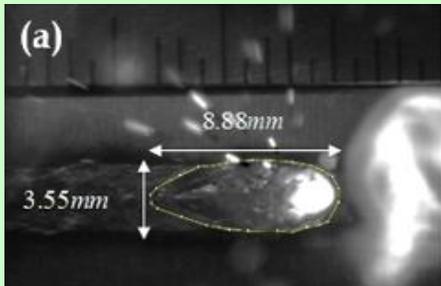


Precitec#3
P=8.25 kW , S=8 m/min
(No wobbling)



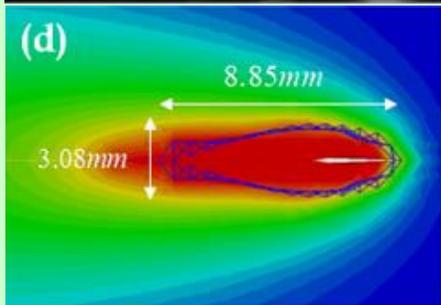
Analyse Comparative des Résultats Expérimentaux et des Simulations Numériques pour la Surface du Bain de Fusion dans le Soudage au Laser d'Aluminium 6061-T6

Precitec#1
P=5.5 kW, S=5 m/min
(No wobbling)



Fusion zone area

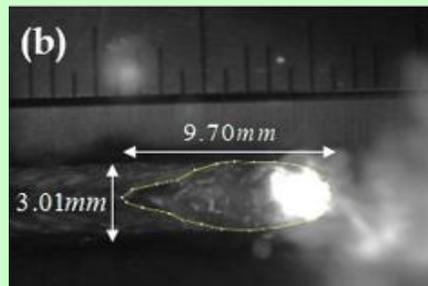
21.73mm²



Fusion zone area

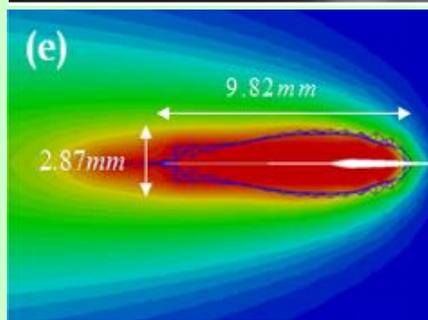
20.40mm²

Precitec#2
P=6.75 kW, S=6.5 m/min
(No wobbling)



Fusion zone area

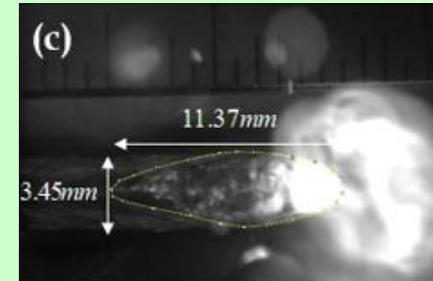
19.95mm²



Fusion zone area

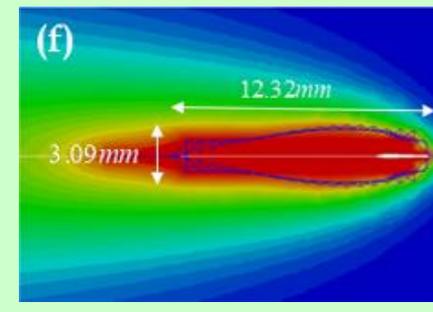
21.00mm²

Precitec#3
P=8.25 kW, S=8 m/min
(No wobbling)



Fusion zone area

23.59mm²

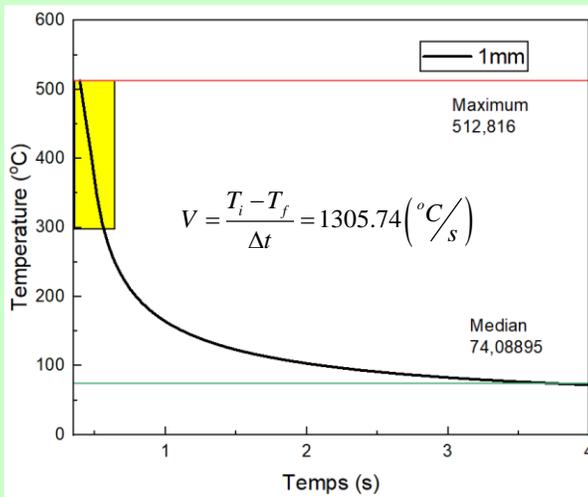


Fusion zone area

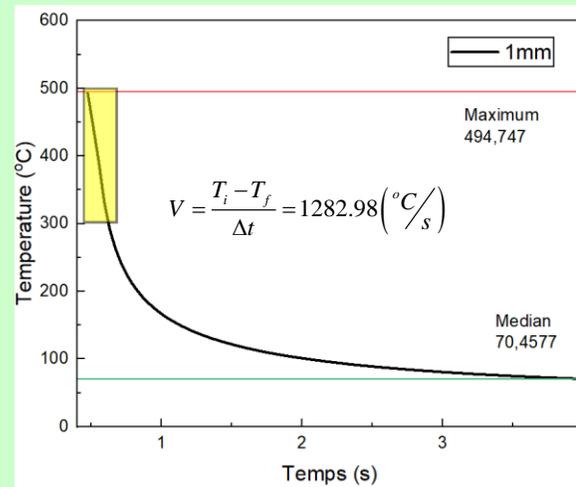
25.60mm²

Résulta des Vitesses de Refroidissement lors du Soudage au Laser d'Aluminium 6061-T6

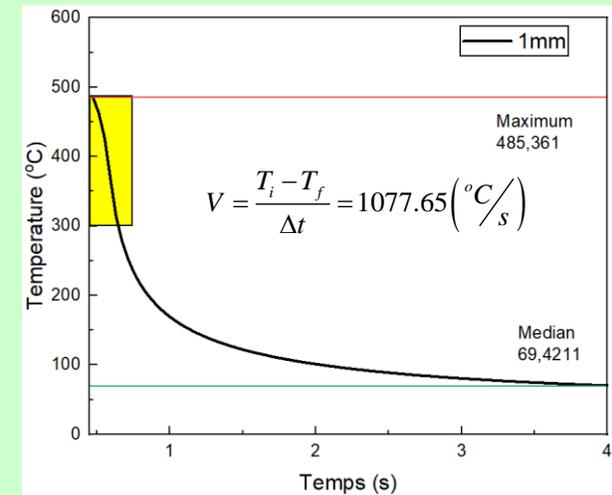
Precitec#1
P=5.5 kW , S=5 m/min
(No wobbling)



Precitec#2
P=6.75 kW , S=6.5 m/min
(No wobbling)

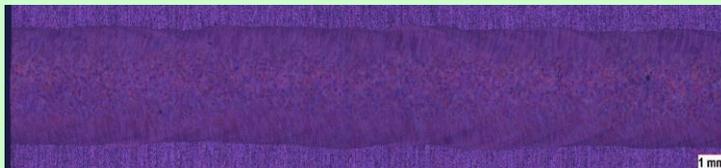
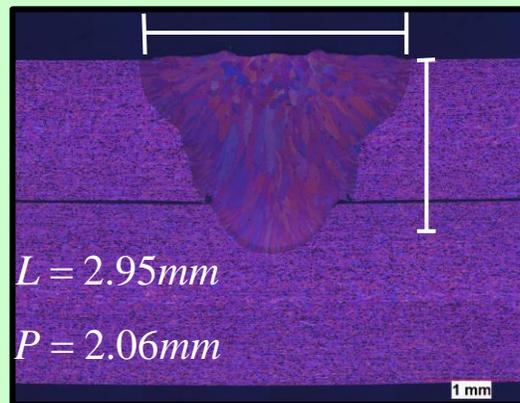


Precitec#3
P=8.25 kW , S=8 m/min
(No wobbling)

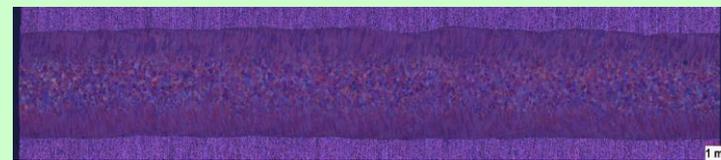
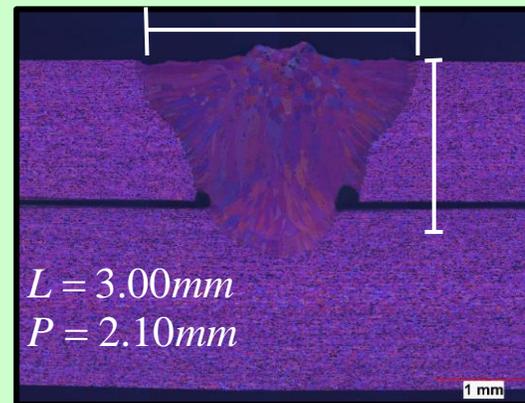


Analyse en Profondeur : Imagerie des Sections Transversales et Vues dessus

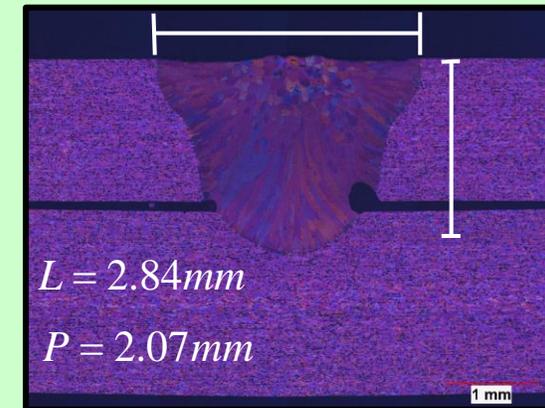
Precitec#1
P=5.5 kW , S=5 m/min
(No wobbling)



Precitec#2
P=6.75 kW , S=6.5 m/min
(No wobbling)

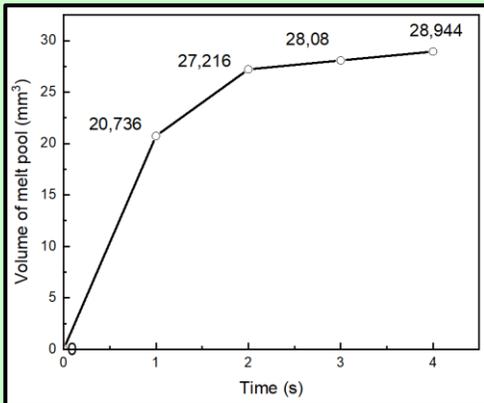
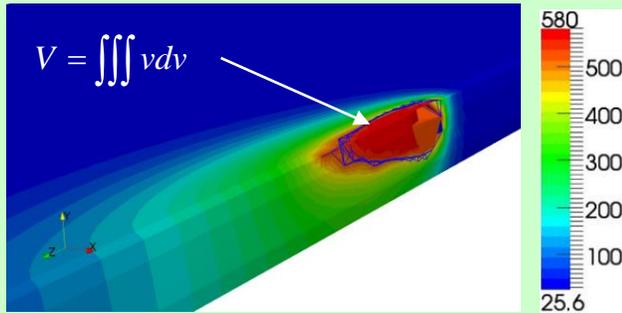


Precitec#3
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(No wobbling)

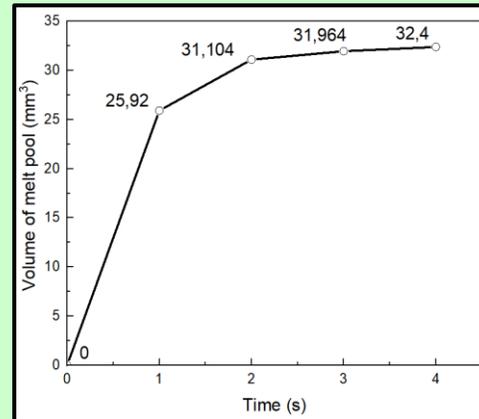
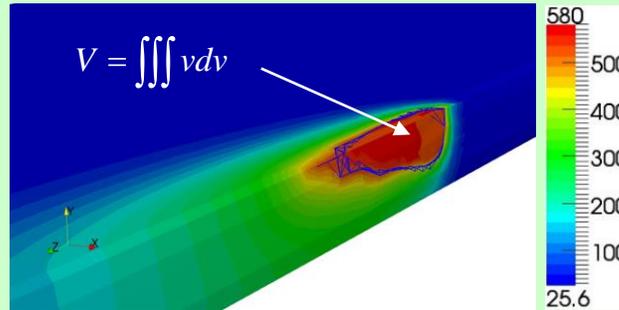


Dynamique du Bain de Soudure : Suivi de l'Évolution Volumétrique lors du Processus de Soudage Laser

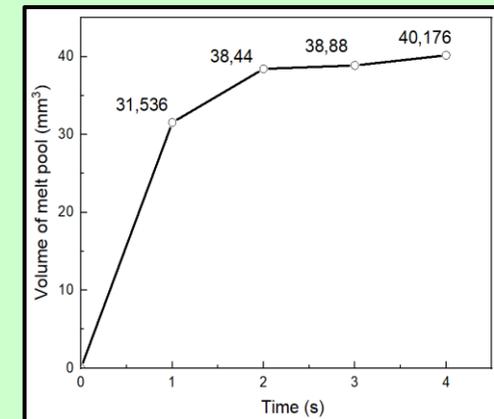
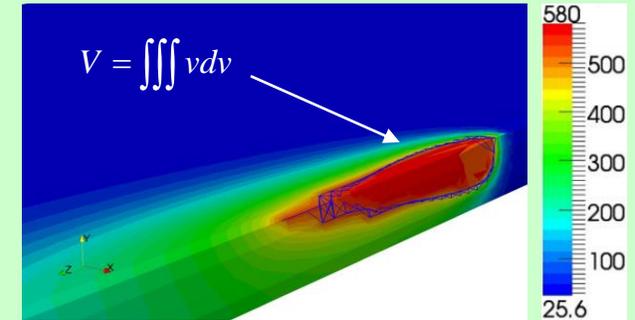
Precitec#1
 P=5.5 kW , S=5 m/min
 (No wobbling)



Precitec#2
 P=6.75 kW , S=6.5 m/min
 (No wobbling)



Precitec#3
 P=8.25 kW , S=8 m/min
 (No wobbling)



Merci de votre attention

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