

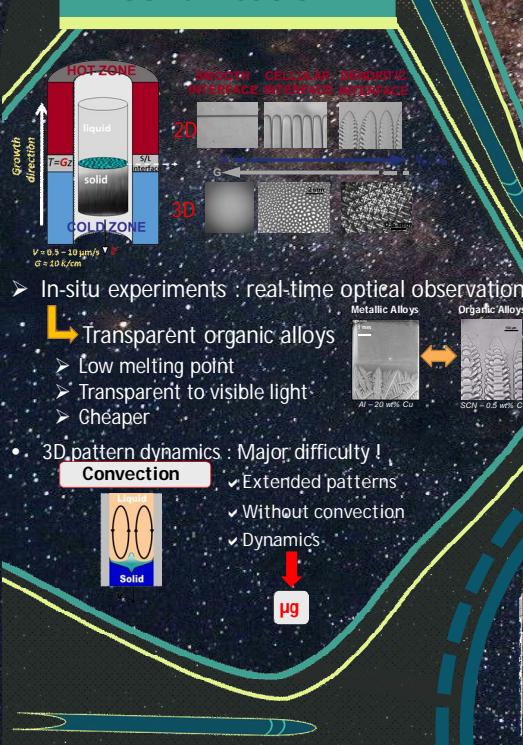
# Dynamique de formation des réseaux dendritiques étendus en régime de transport diffusif

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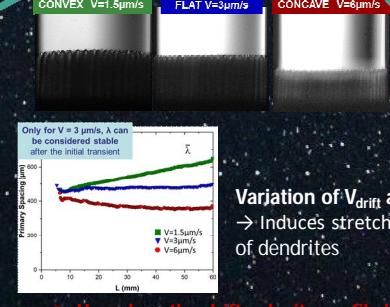
IM2NP, Institut des Matériaux Microélectronique Nanosciences de Provence



## Directional Solidification

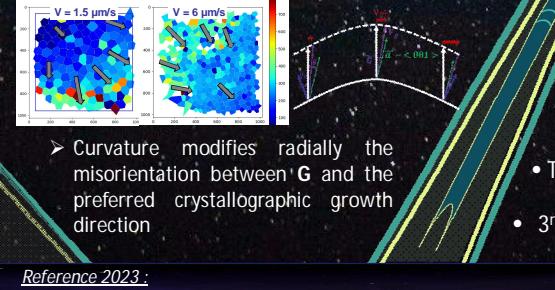


## Curvature effects



Variation of  $V_{\text{drift}}$  along the interface  
→ Induces stretching/compression of dendrites

How does the drift velocity profile build?

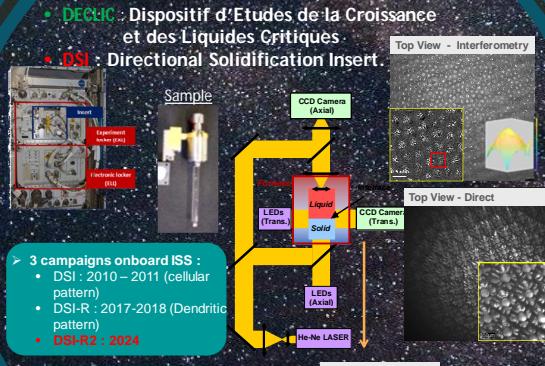


Curvature modifies radially the misorientation between  $G$  and the preferred crystallographic growth direction

## Dendritic Structure

- Self-organization in non-linear dynamics systems
  - Found in nature: lightning, branching trees
- Industrial interest:
  - Advanced materials with controlled properties
    - Cristal quality and orientation
    - Defects
  - Ex : Ni-based superalloys

## Microgravity experiments ISS

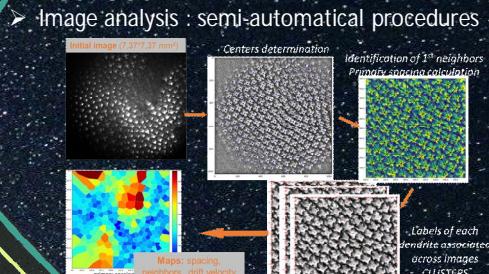


## Dynamics characterization

### Objectives

- Primary spacing selection: benchmark data & mechanisms
- Primary arms and secondary arms interactions
- Grain competition
- Multistability (transitions, instability thresholds...)

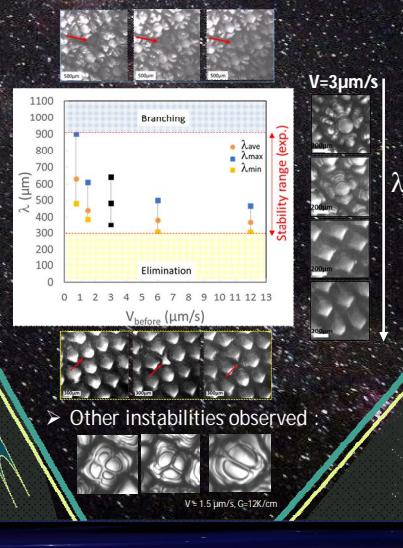
### Methods



## Stability range

### Method:

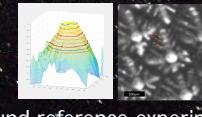
- Velocity jump experiments ( $12, 6, 1.5, 0.75 \mu\text{m/s} \rightarrow 3 \mu\text{m/s}$ )



## Perspectives

- Control of texture: Grain competition

- Tip & branches characteristics
- 3rd campaign preparation and ground reference experiments



Other instabilities observed: