150mm Thin Wafer Handling Upgrade for GSD Platform

GSD 200E², HE/VHE

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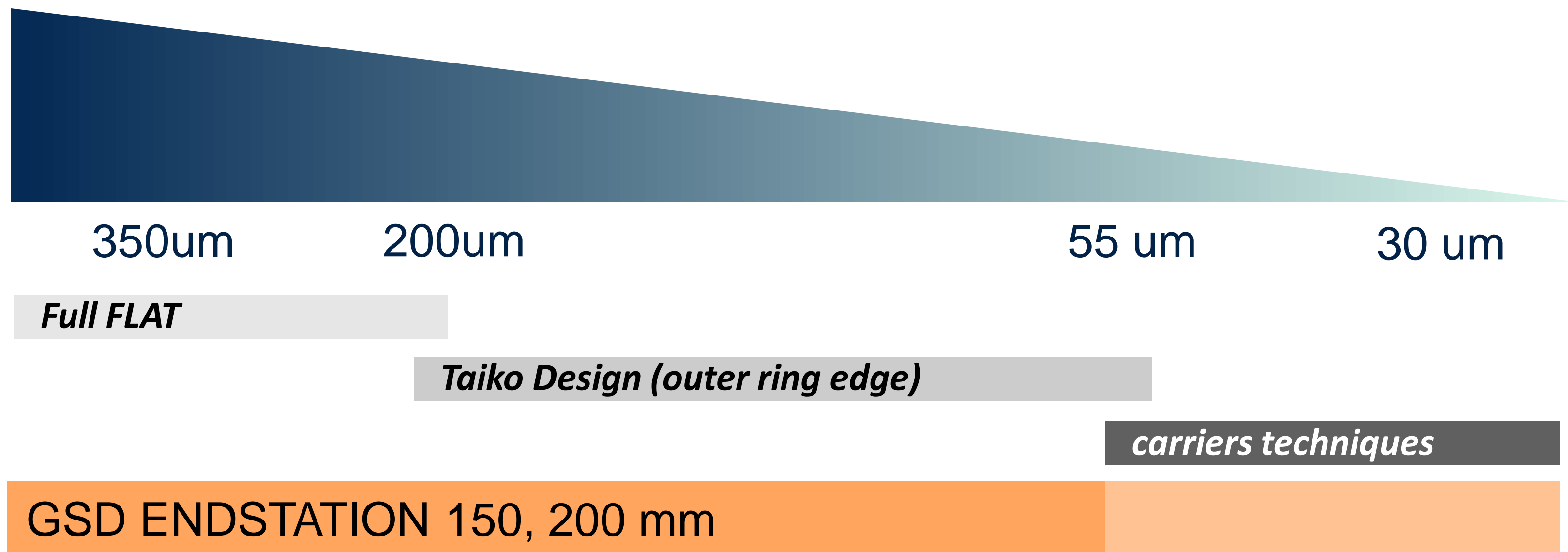
Power Devices, 3D Packaging Application Specifics
Axcelis Thin Wafer Solution



- **GSD Platform with Axcelis Thin Wafer Handling Options**
  - ***150mm*** **thin wafers in production has increased significant in past 10 years**
  - **New generation upgrade enables wafer thickness of 215 um (without tape) and down to 55um with annulus ring and protective tape**
- **GSD wafer handling system automatically handles both thin and standard wafers**

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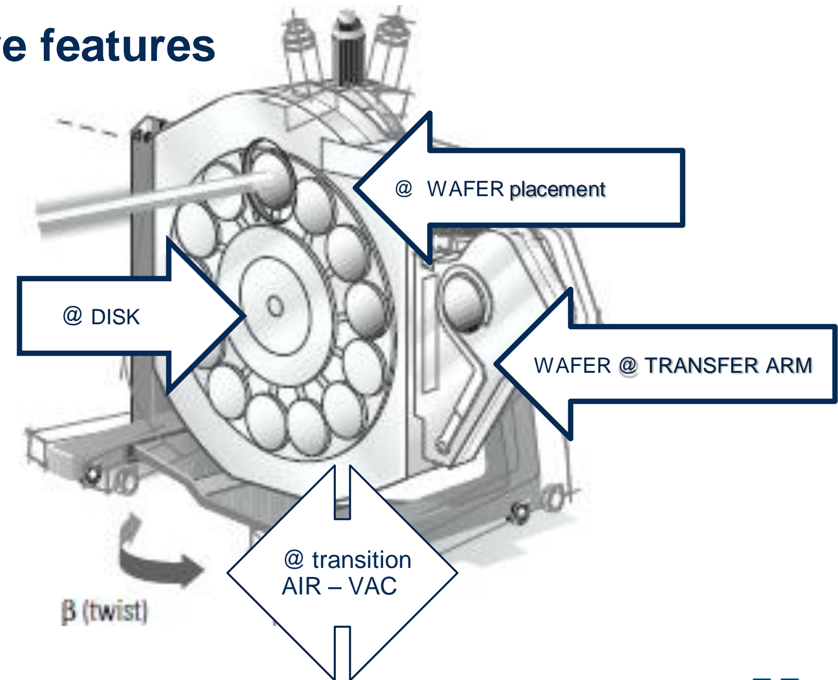
Technical Challenges Being Addressed

- **Causes of mechanical stress on thin wafers**
  - **In-air locations at robot level, flat aligner**
  - **During transition from in air to vacuum**
  - **In vacuum:**
    - **Transfer arm**
    - **Wafer holder and disk**
  - **Combination of hardware and software features**



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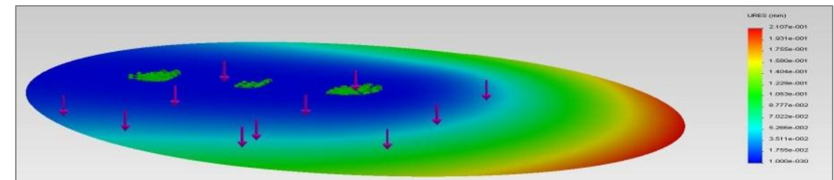
Eliminate Unwanted Forces With Innovative Robot End-effector

- Optimization of in-air wafer contact: new vacuum channel geometry
- Minimal deflection on thin substrate
- Low contamination wafer pan: carbon fiber, teflon cover

New End-effector Design with Material Designed for Low Metal Contamination



Optimize Deflection, Minimal Contact

Old End-effector – Creates Deflection

NEW End-effector – No Deflection

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Innovative Solution for Disk Clamping

FORMER VERSION
Bowing of wafer on pad

INNOVATIVE SOLUTION
For Perfect Wafer Positioning

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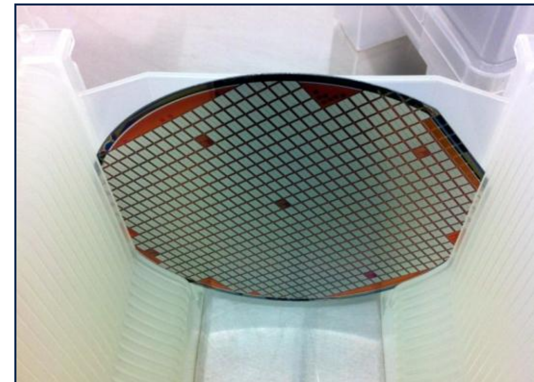
Current Capabilities on 150mm Thin Wafers



Currently in Manufacturing Environment

Si Wafer Design	Wafer Thickness (µm)	Disk spin speed (rpm)
Full Flat	675 - 300	1210
	300 - 250	815
	250 - 215	613
Thin with outer ring (*)	> 200 - 120	815
ring thickness 625um, 2mm wide	120 - 50	613
Thin with outer ring (*) ring thickness 450um, 7mm wide	200 - 130	815
Thin with outer ring (*) ring thickness 450um, 7mm wide	130 - 50	613

(*) protective tape

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