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IEMN Packaging ressources

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ACTION CONCERTÉE TRANSVERSE PAC



IEMN Packaging ressources

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Laser micromachining

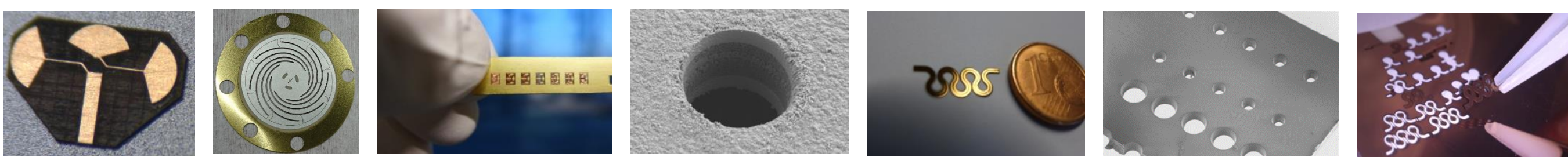


System 1

- Multi-wavelength femtosecond (300fs) lasers (343,515,1030nm)
- galvanometer deflection with extended field of 50x50mm²
- sample stage up to 300x300 mm² with linear accuracy +/- 0.5 μm, repeatability +/- 0.2μm
- Trepan head
- Position synchronized output (PSO)

System 2

- High power UV nanosecond DPSS laser (351nm)
- galvanometer deflection with extended field of 50x50mm²
- sample stage up to 300x300 mm² with linear accuracy +/- 0.5 μm, repeatability +/- 0.2μm



Lapping - Polishing

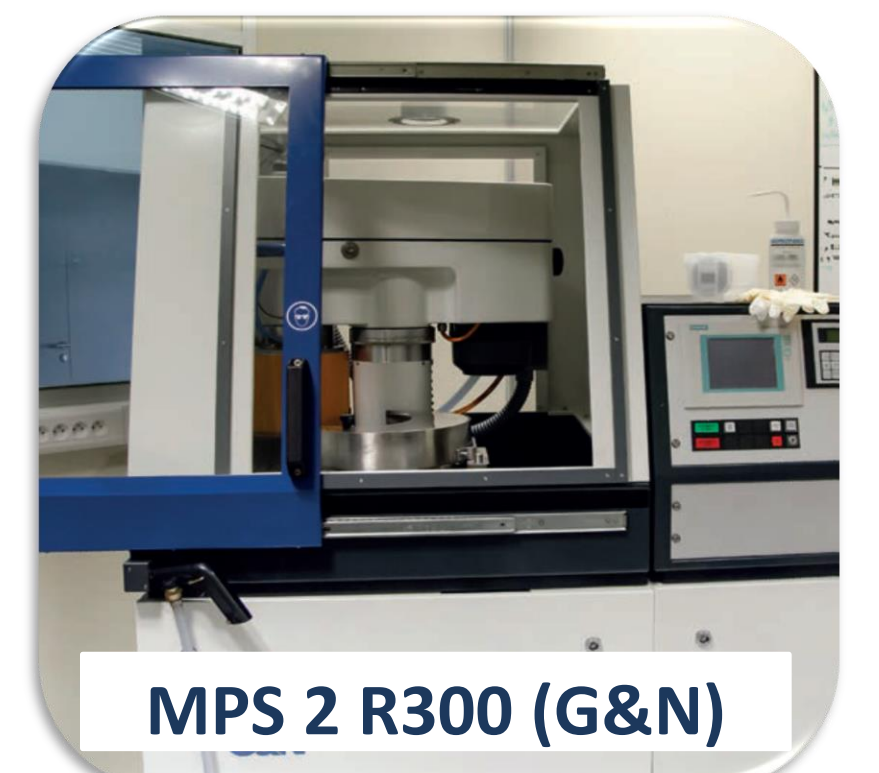


LOGITECH systems

- Wax bonding
- Materials: III-V Materials (InP, AsGa), Si...
- Up to 4" wafers and small pieces
- Sample maximum thickness: 2 mm
- Plate speed: 0-70 rpm
- Applied pressure: 0 to 2 kg
- Removed material : 1 to 5 μm/min
- Thickness resolution : +/- 5 μm
- Roughness of the order of nm

Grinder

- Substrate size: 3 inches
- Substrate rotation speed: 0-30 rpm
- Head max rotation speed: 2600 rpm
- Height precision: 3 μm
- Grinding speed: 1-30 min⁻¹
- Materials: Silicon SiC glass



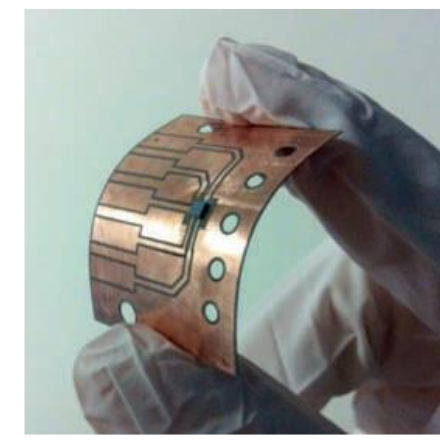
Assembly

Pick and place machine



JFP - PP6

The machine provides for single collet vacuum pick and place of die adjustable and repeatable subsonic scrub. The placement accuracy is < 3μm, upon configuration. Small and large devices can be placed with flipped vision.



Scriber

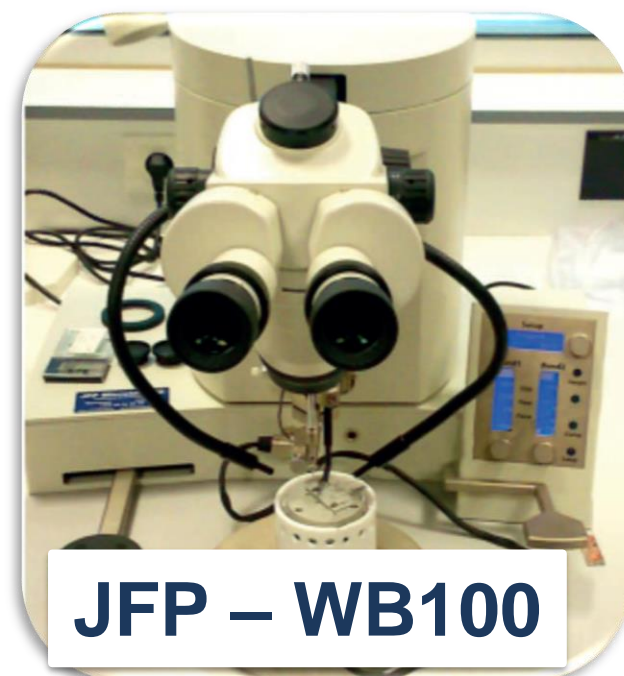
- Diamond peak
- Substrate up to 4 inches
- Materials: Si, AsGa, InP
- Resolution of position: 1 μm



JFP - Model 100

Wirebonding

- Wire types: Au
- Wire diameters: 17 and 25 μm
- Principle: ultrasonic and thermosonic



JFP - WB100

CMP



E 460 (ALPSITEC)

- Substrates: from 2 to 4 inches,
- Substrate rotation speed: 5-130 rpm
- Plate rotation speed: 5-120 rpm
- Applied pressure: 0-950 mdaN/cm²
- 10 steps per recipe
- 4 slurries possible during the process
- Materials: Si, poly Si, SiO₂, metals
- Maximum removed thickness: 20 μm

CNC milling machine

Contact : Jean-Michel Mallet



DATRON NEO

Compatible materials:

- Composites
- Aluminum • Plastics
- Light alloys • Wood
- Carbon fiber reinforced plastic
- Stainless steel
- Green ceramics

Dicing saw

- Rotation speed of the blade: 6,000 - 60,000 rpm
- Chuck displacement speed: 0.1 - 600 mm/s
- Substrates size: up to 8 inches max
- Optical alignment of the blade



DISCO DAD3240

Wafer bonding

Contact : Pascal Tilmant

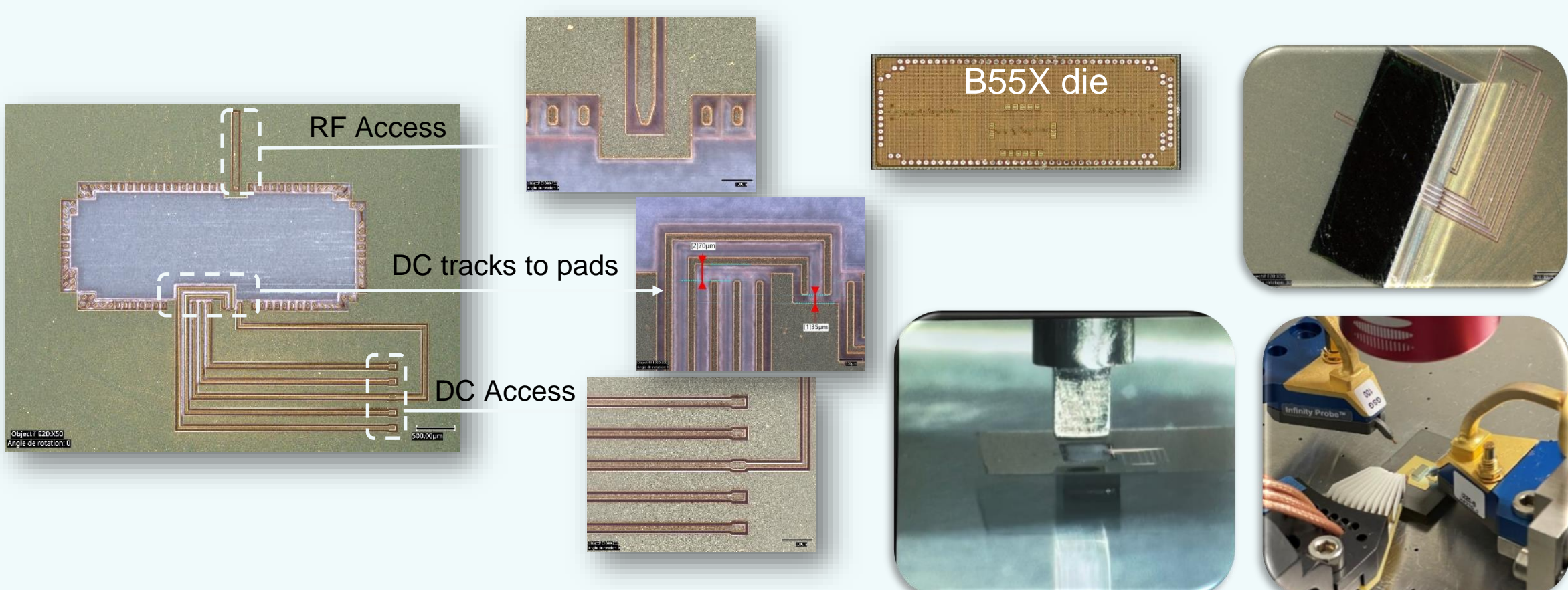


Suss SB6e wafer bonder

- For aligned and unaligned wafers using thermo-compression, anodic, fusion, adhesive, etc
- Wafer size: pieces smaller than 2 inch, up to 4 inch
- Aligned bonding: down to 3 μm depending on process conditions

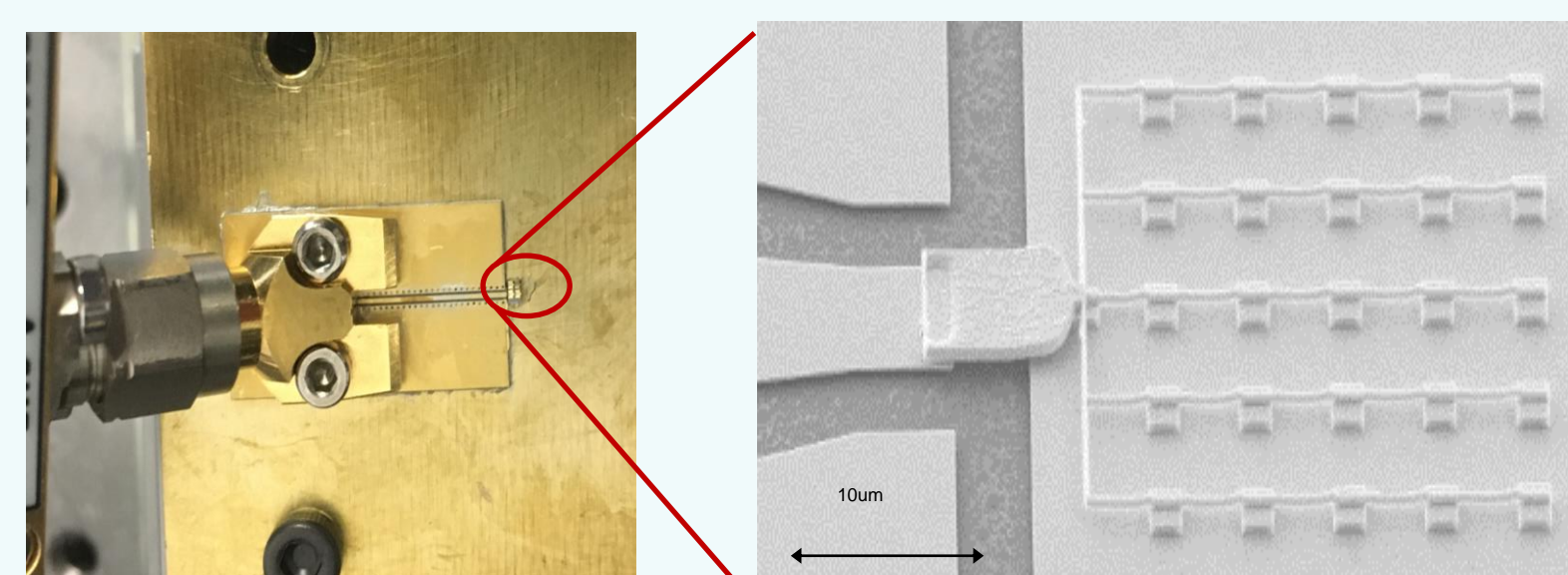
Examples

Glass Interposer Technology



Maya Alawar, et al. "A G-Band Glass Interposer Technology for the Integration of an Amplified Noise Source Based on SiGe BiCMOS 55-nm Technology." *Radio Frequency Integrated Circuits Symposium*, 16-18 June 2024 in Washington, DC

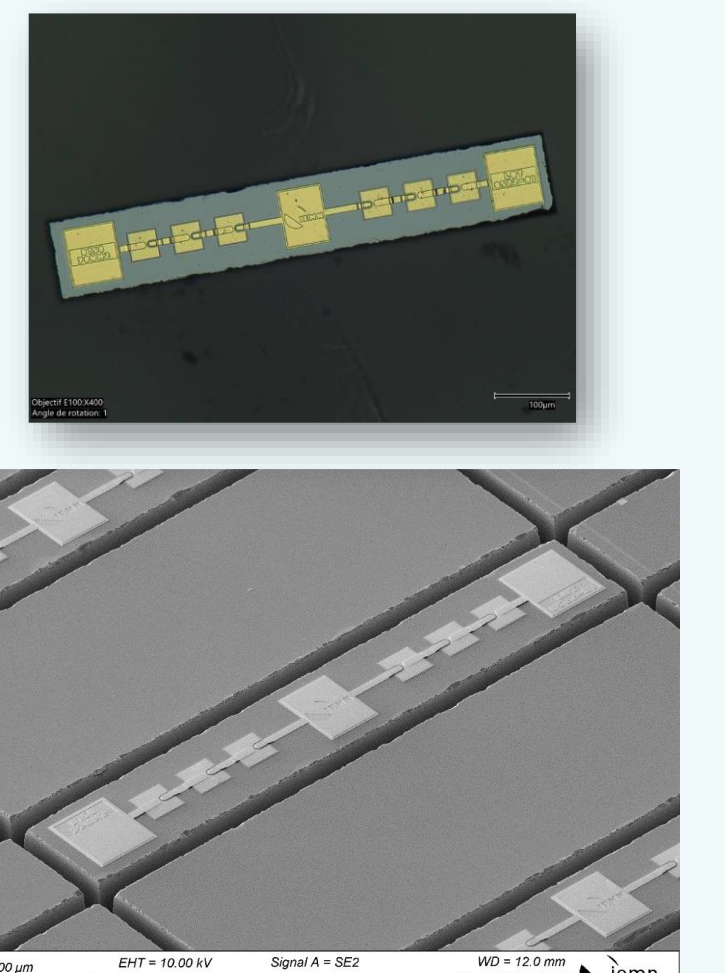
Example of packaged photo-detector with coplanar access and V-connector



Lin, Quyang, et al. "Real-time, chirped-pulse heterodyne detection at room temperature with 100 GHz 3-dB-bandwidth mid-infrared quantum-well photodetectors." *Optica* 10.12 (2023): 1700-1708.

Cutting and thinning of GaAs Schottky diodes

- Air bridge resin coating and precut
- Resin removal and protective resin coating
- Wax bonding and mechanical thinning
- Release of components



Bouillaud, H., et al. "GaAs Schottky Diodes Development for Millimeter Wave Doubler." *Wocsdice 2021-44th Workshop on Compound Semiconductor Devices and Integrated Circuits held in Europe*, 2021.

RENATECH

CEA-Leti

Au service des 64 équipes de recherche du PEPR



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