The Synergy of Water and Fire

Laser MicroJet®

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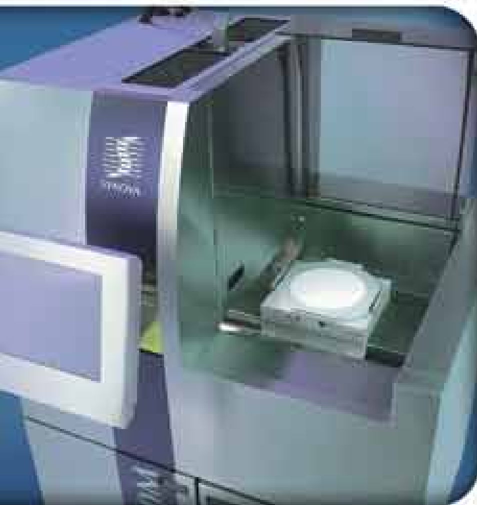
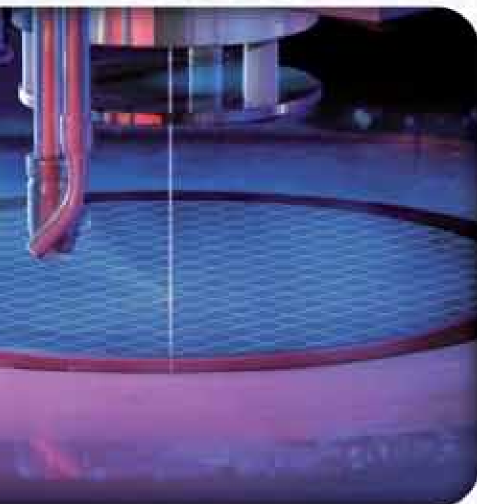
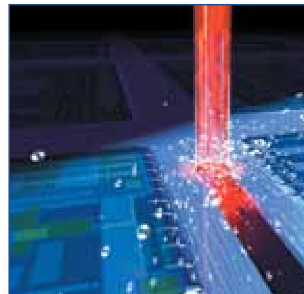






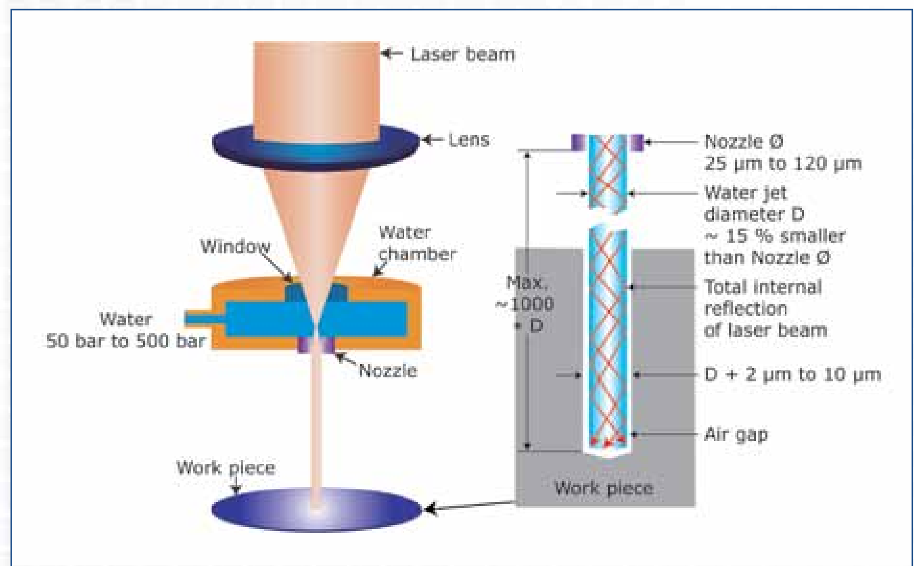
Synova is a leading provider of innovative laser cutting systems for a broad range of micromachining and dicing applications. Our aim is to provide leading-edge device manufacturers with superior manufacturing and cost-competitive advantages through the use of our technology.

Our proprietary Laser MicroJet®, a water jet-guided laser cutting technology, is rapidly emerging as the ideal industrial solution for meeting the demanding manufacturing specifications and low cost-of-ownership requirements associated with high-volume production of today's advanced electronic and micromechanical devices. With this unique, patented Laser MicroJet® technology, the laser beam is focused and guided into a hair-thin, low-pressure water jet to precisely target material process steps such as cutting, grooving and scribing.

The Laser MicroJet® technology

Laser MicroJet® is an innovative hybrid method combining a laser beam with a low-pressure water jet, which cools the cutting and offers extreme precision debris removal.

The low-pressure water jet, emitted from the nozzle, guides the laser beam by means of total internal reflection at the water/air interface, in a manner similar to conventional glass fibers. It is therefore a "cold and clean laser" preventing all the known problems associated with dry lasers such as thermal damages, non-uniform deposition and lack of accuracy.



SYNOVA

What are Laser MicroJet® technical parameters?

The Laser

Lasers used are pulsed lasers with pulse durations in the micro- or nano-second range, operating at 1064 nm (IR), 532 nm (Green), or 355 nm (UV).

The Water

Pure de-ionized and filtered water, at low pressure, is used. Because the jet is virtually "hair thin," the level of water consumption is extremely low — on the order of 5 liter per hour at 300 bars water pressure and the resulting force is negligible.

The Nozzles

The nozzles range in diameter from 30 to 120 µm and are made out of sapphire or diamond, as these materials' hardness enables generation of a long, stable water jet.

Technology Benefits

Excellent quality

- o Very little thermal damage
- o No mechanical stress
- o Parallel cuts
- o Cleaner surfaces

Yield improvements

- o Less scrap
- o Less rework
- o High fractural strength

Flexibility

- o Different heights
- o Different geometries

Lower Operating Costs

- o No tool wear
- o Very few consumables

Europe - USA - Asia

The Markets

• Semiconductors (incl. Solar) :

* Materials: Silicon, Solar Cells, Power Devices, Compound Semiconductors (GaAs, CZT, PZT, Diodes, etc.)

* Operations: Dicing, Edge Grinding, Scribing, Chamfering, Edge Isolation

• Cutting Hard materials for Ceramics and the Tooling Industry:

* Materials: Ceramics, Cubic Boron Nitride (CBN), Polycrytalline diamonds (PCD), Tungsten Carbide, etc.

* Operations: Cutting with Angles, Drilling, Shaping, etc.

• Cutting Metals for several markets (Consumer, Automotive, Watch making, Medical):

* Materials: Aluminum, Copper, Stainless Steel, Nickel, Titanium, etc.

* Operations: Cutting, Drilling, Grooving

The machines

LDS 200/300 - Laser Dicing System

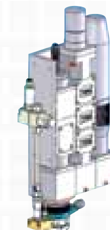
The LDS is primarily designed for semi-conductor back-end processing. Application processes include dicing, edge grinding, thinning, hole drilling, slotting, grooving, inking, isolating and marking.

LCS 150/300 - Laser Cutting System

The LCS is a versatile tool conceived for micro-cutting applications in a variety of applications and industrial sectors.

HLS 300 - Hybrid Laser Saw

The HLS is combines two dicing methods: diamond saw and Laser MicroJet®. The tool is optimizing both processes for combining manufacturing throughput and cut quality.



LMJ-iP - Integration package

Synova now also offers core components of its Laser MicroJet® systems, allowing manufacturing companies to integrate modules directly into their own production lines.

SYNOVA
Innovative Laser Systems

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