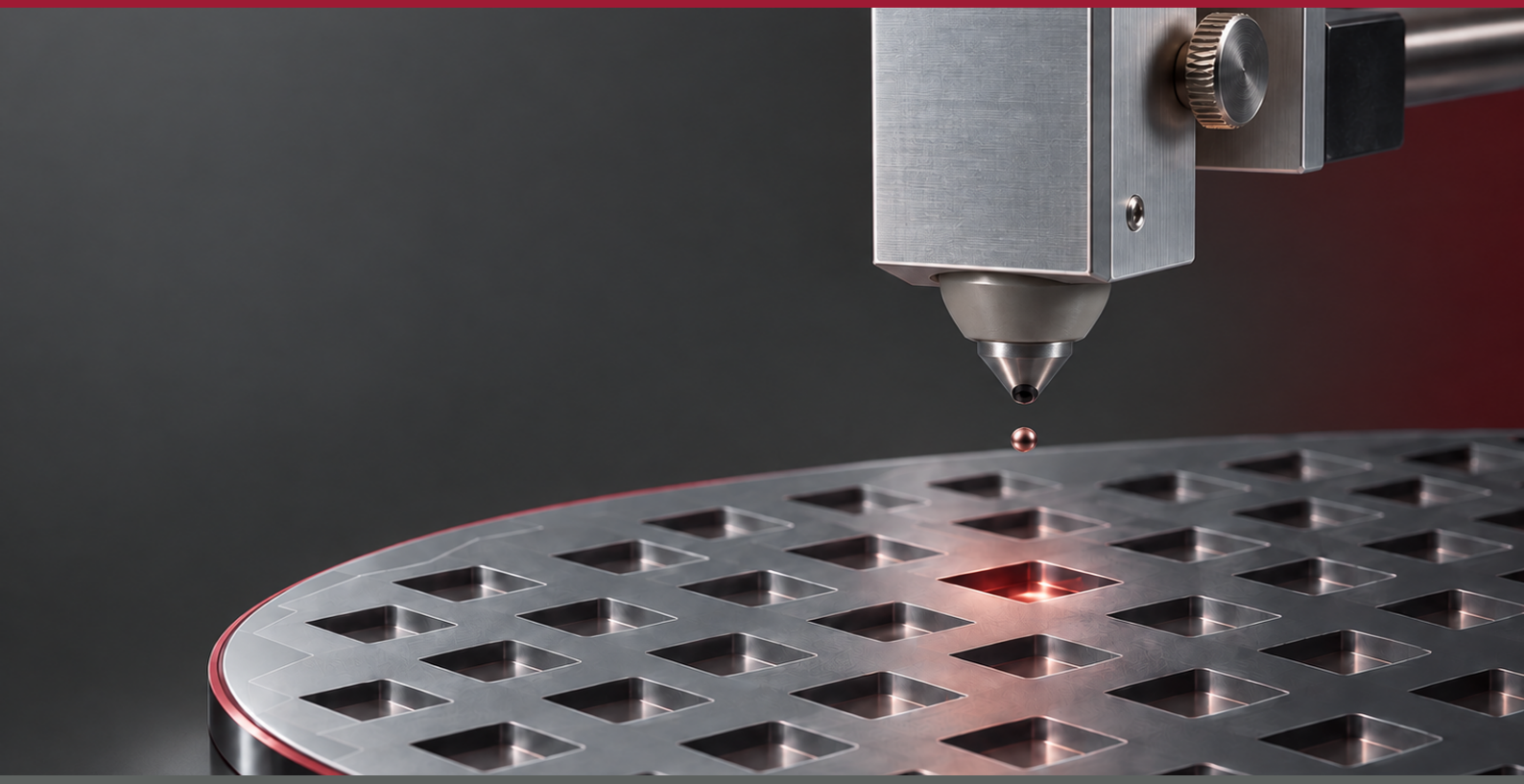
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TECHNOLOGIES

DIGITAL RUBIDIUM DISPENSING

Picoliter drop-on-demand deposition for microfabricated atomic vapor cells



Conceptual process illustration · not to scale · not a customer result

KI-generated Image

ONE DROP. A PROGRAMMABLE MATERIAL INCREMENT.

Molten elemental rubidium is dispensed without contact into selected microcavities. Autodrop Gantry II moves the MD-K-240 across the wafer, programming each position and the number of drops.

~300–400 pL
per Rb drop*

~100 Hz
drop sequence*

70 µm
glass capillary

*Indicative Rb trial values, not a validated volume-accuracy specification.

Developing a microfabricated Rb vapor cell?

Discuss your filling process with us.

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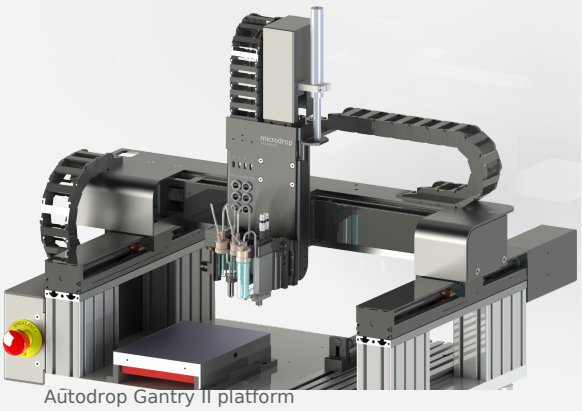
FROM THE DROP TO THE WAFER

MD-K-240 · heating · Autodrop Gantry II

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THE MANUFACTURING STEP

Microfabricated alkali vapor cells support compact atomic clocks and magnetometers [1, 2]. Autodrop Gantry II positions the heated MD-K-240 over the wafer for digital Rb filling, a distinct cell step [3].



Autodrop Gantry II platform

1 HEAT	Melt pure Rb at ~60 °C under an inert atmosphere.
2 FILL	Transfer molten Rb into the heated dispenser reservoir.
3 CHECK	Inspect drop formation with integrated image control.
4 DISPENSE	Autodrop Gantry II moves the head above cavities to dispense.

CONFIGURATION FOR Rb

Dispensing head	MD-K-240 · piezo tube around glass capillary
Material path	Glass reservoir and glass capillary; small PTFE seal at joint
Thermal setup	Heated enclosure around reservoir and dispenser
Deposition	Non-contact; single drops or programmable sequences
Automation	Autodrop Gantry II · 3 axes; programmable patterns
Process environment	Inert-atmosphere glovebox; integration available

PROCESS DEVELOPMENT

Dispensing patterns are digital and maskless at the deposition step. Subsequent cell sealing is possible as a separate process carried out by the cell manufacturer.

Selected technical references

[1] NIST · Microfabricated alkali atom vapor cells

[2] NIST · Microfabricated Atomic Sensors

[3] NIST · Wafer-Level Fabrication of Alkali Vapor Cells

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