

Wafer-Level Fabrication of Resonators with Glassblown Structures

Tech ID: 34859 / UC Case 2022-733-0

BRIEF DESCRIPTION

A novel wafer-level process integrating glassblowing, etching, and plasma bonding enables precise, scalable fabrication of YIG-based resonators with enhanced performance and miniaturization.

FULL DESCRIPTION

This technology provides systems and methods for wafer-level manufacturing of resonators, specifically designed for yttrium iron garnet (YIG) spheres. It combines isotropic cavity etching of glass wafers, high-temperature glassblowing to form dual hemispherical structures, plasma-assisted wafer bonding, and precision assembly of YIG spheres into nests within the wafer stacks. The inner hemisphere incorporates loop coils for resonance detection and driving, while the outer hemisphere includes tuning coils for frequency adjustments. The method allows placement of coils within microns of the ferrimagnetic elements, overcoming limitations of bulky, manual YIG resonator assembly and enabling scalable, high-precision production.

SUGGESTED USES

- » High-frequency communication components and filters
- » Advanced oscillator circuits requiring miniaturized, tunable resonators
- » RF and microwave sensor technologies
- » Precision timing devices for telecommunications and aerospace systems
- » Integrated photonic and magneto-electronic devices

ADVANTAGES

- » Wafer-level fabrication enabling batch processing and scalability
- » Precise placement of coils in close proximity (few microns) to YIG spheres for optimized resonance performance
- » Elimination of manual, "boutique" fabrication processes; reduces labor and cost
- » Integration of glassblown inner and outer hemispheres for efficient coil formation and frequency tuning
- » Use of plasma-assisted wafer bonding ensures reliable encapsulation and assembly
- » Compatibility with silicon and glass substrates for versatile device architecture

PATENT STATUS

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OTHER INFORMATION

CATEGORIZED AS

- » **Sensors & Instrumentation**
- » Analytical
- » Other
- » Position sensors

RELATED CASES

2022-733-0

Country	Type	Number	Dated	Case
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United States Of America	Published Application	2025013644	05/01/2025	2022-733
Patent Cooperation Treaty	Published Application	WO 2023/141492	07/27/2023	2022-733

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