



# Polarization Standing Wave Cavity Assisted By Anisotropic Structures

Tech ID: 28943 / UC Case 2017-878-0

## SUMMARY

Researchers in the Department of Electrical Engineering have developed a cavity demonstrating resonance through polarization standing waves.

## BACKGROUND

Resonator is one of the fundamental building blocks for microwave and RF devices. Conventional resonators, such as microstrip resonators, are limited by their low RF handling power and quality factor, Q, a parameter associated with energy losses within the cavity. Other resonators, such as waveguide resonators, have higher quality factors but tuning their frequency is difficult.

## INNOVATION

Researchers at UCLA have developed a cavity resonator with high RF power handling, high quality factor, and easy tunability. The waveguide cavity demonstrates resonance through a polarization standing wave, resulting in cavity size reduction. The resonator quality factor is 60X greater than microstrip resonators. The easy frequency tunability creates a structure much cheaper than conventional waveguide cavities and provides an easier and more robust frequency tuning mechanism for mm-waves and THz region.

## APPLICATIONS

- ▶ Wireless communications
- ▶ Microwave and RF devices (i.e. lasers, photodetectors)

## ADVANTAGES

- ▶ Quality factor 60 times greater than microstrip resonators
- ▶ Greatly reduced cavity size
- ▶ Cheaper than conventional waveguide cavities
- ▶ Easier implementation for tuning frequency at high frequency

## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,615,473	04/07/2020	2017-878

## RELATED MATERIALS

- ▶ D. Chen, L. Xu, C. Curwen, M. Memarian, J. Reno, T. Itoh, & B. Williams. “Metasurface Terahertz Laser With Electronically-Controlled Polarization.” CLEO: QELS Fundamental Science, 2017, FTu4G.
- ▶ M.L. Chen, L.J. Jiang, E.I. Wei, W.C. Choy, & T. Itoh. “Polarization Control by Using Anisotropic 3-D Chiral Structures. IEEE Transactions on Antennas and Propagation.” 64(11), 2016, 4687.
- ▶ X. Li., M. Memarian, & T. Itoh. Blazed metasurface grating: A New Resonance in a Circular Waveguide Cavity Assisted by Anisotropic Metasurfaces In Microwave Symposium (IMS), 2016 IEEE MTT-S International(pp. 1-3). IEEE

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

## CONTACT

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## INVENTORS

- ▶ Itoh, Tatsuo

## OTHER INFORMATION

### KEYWORDS

Waveguide cavity, resonant cavity,  
  
frequency tuning, polarization  
  
standing wave, resonance

### CATEGORIZED AS

- ▶ **Optics and Photonics**
  - ▶ All Optics and Photonics
- ▶ **Communications**
  - ▶ Optical
- ▶ **Semiconductors**
  - ▶ Design and Fabrication

### RELATED CASES

2017-878-0

- ▶ [Self-biased Receiver System](#)
- ▶ [Backfire-to-endfire Leaky-wave Antenna](#)

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