



# IMPI'S 57<sup>TH</sup> ANNUAL MICROWAVE POWER SYMPOSIUM

The Premier Industry-Wide Microwave Power Event

## IMPI 57 Short Course:

### Dielectric Material Properties Measurements

From stealth materials to dielectric substrates, microwave food products to biofuels, accurate characterization of their electromagnetic properties provide engineers with critical information needed for material and circuit design, modeling, research, manufacturing, and quality control. Many measurement methods exist, but which to choose is often a mystery. The intent with this short course is to clear the air by providing an overview of measurement methods, with strengths, limitations, and applications of each.

In addition, there is an urgent need to measure low-loss materials at millimeter-waves (mmWaves) and sub-THz frequency. Until now the researchers, designers and manufactures routinely extrapolate material properties from low frequency to higher frequency, which can lead to mistakes that can have potentially devastating costs. With Keysight's latest solution and available fixtures combined with proven performance of RF and mmWave instruments, this urgent need can be solved easily and cost effectively.

This course will also cover traceable microwave measurements for materials. Today, no traceable standard or standard reference material for complex permittivity currently exists. Without a standard, a material producer and consumer may disagree on the measured value of the complex permittivity of a given sample and have no recourse to know who is correct. Errors in the complex permittivity can lead to disagreements between a device measured and modeled performance. In the following talk, results from a round-robin experiment on a prototype fused silica standard reference materials for complex permittivity from 10 GHz – 110 GHz will be discussed. Also, the underlying metrology of split cylinder resonators, how they work, and what you need to know to use them in your labs will be reviewed.

## Confirmed Short Course Speakers



**Say Phommakesone**  
Applications Engineer  
Keysight Technologies, USA



**Nate Orloff**  
Microwave & mmWave Materials Lead  
NIST, USA

**June 27, 2022**

**8:00 am – 11:45 am**

The Curtis Hotel, Denver,  
Colorado, USA

### Registration Fees:

\$275 ( IMPI Members )

\$325 ( Non-members )



Register at: <https://impi.org/events/symposium/>