Docket #: S16-469

Non-Reciprocal Microwave Window

The Stanford team's invention of ferrite microwave window is a breakthrough in high-power microwave protection. Unlike conventional circulators and isolators that overheat and fail under extreme loads, this novel design integrates a cylindrical ferrite disk into a polarized waveguide and applies a magnetic bias. The result is a non-reciprocal device that cleanly transmits one polarization while reflecting the opposite, with minimal loss.

This innovation directly addresses the need in today's high-power systems: protecting amplifiers and sources from damaging reflected power. By reducing heat buildup and eliminating electrical breakdown, the ferrite window delivers an order-of-magnitude improvement in power handling, improves efficiency, and extends system reliability. Its compact, scalable design makes it ideal for critical applications in accelerator facilities, industrial processing, medical systems, and defense. With high power capacity and intrinsic low-loss operation, the ferrite microwave window sets a new standard for next-generation high-power microwave components.

Applications

- **High power electronics** - circulators, isolators, and phase shifters. Protect equipment and mitigate failures

Advantages

- **High power capacity**
- **Low-loss operation**
- **Compact and scalable design**
- **Extends system reliability**

Publications

- M. A. Franzi, S. Tantawi, V. Dolgashev, E. Jongewaard and J. Eichner (2020) Novel High-Power Microwave Circulator Employing Circularly Polarized Waves. IEEE Transactions on Plasma Science, vol. 48, no. 6, pp. 1984-1992

Patents

- Published Application: 20210167475
- Published Application: 20220115758
- Issued: 11,817,612 (USA)

Innovators

- Matthew Franzi
- Sami Tantawi

Licensing Contact

Evan Elder

Associate Director, Licensing and Strategic Alliances, Physica

Email