

# Microwave Discharge in Stratospheric Air



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## Education and experiences

Ph.D. The College of William and Mary (1993)

B.S., Calvin College (1988)

Grand Valley State University, Visiting Asst. Prof (2005-2007)

Calvin College, Visiting Assistant Professor (2004-2005)

ISCO International, Director of Engineering (1994-2003)

**Areas of expertise:** Solid State Physics, Microwave Techniques in Measurement, Superconductivity

## Grants and awards

S.K. Remillard and B. Mork, Microwave Induced Stratospheric Gas Discharge and Ozone Production, Mich. Space Grant Consortium Seed Grant, 2008-2009.

## Key publications

S.K. Remillard et al., *A Review of HTS Thick Film Microwave Filter Technology*, J. of Supercond., **19**, no. 7-8, pp. 523-530 (2006).

S.K. Remillard et al., *Field Deployable Microwave Filters Made from  $YBa_2Cu_3O_{7-\delta}$  Thick Films*, J. of Supercond., no. **14**, p. 47 (2001).

S.K. Remillard et al., *Electromagnetic resonator*, U.S. Patent# 6,208,227; March 27, 2001.

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We are exploring the gas chemistry and gas dynamics that occur in air when high power microwaves pass through the Earth's stratosphere. Air temperature and pressure in the stratosphere are reproduced in a specially designed gas chamber which includes high vacuum pumps, low temperature refrigeration and a gas analyzer.

The presence of microwaves in stratospheric air induces a state called a *plasma*, where the atoms lose electrons and become ionized. The plasma can be recognized from the visible light discharge seen above. Because ionized oxygen readily reacts to form ozone, it is expected that this research may ultimately result in a method to repair the ozone hole.

