

Scan Angle Stability of a Second-Order Plasma-Switched Frequency Selective Surface

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COMSOL
CONFERENCE
BOSTON2013



Proposed Structure

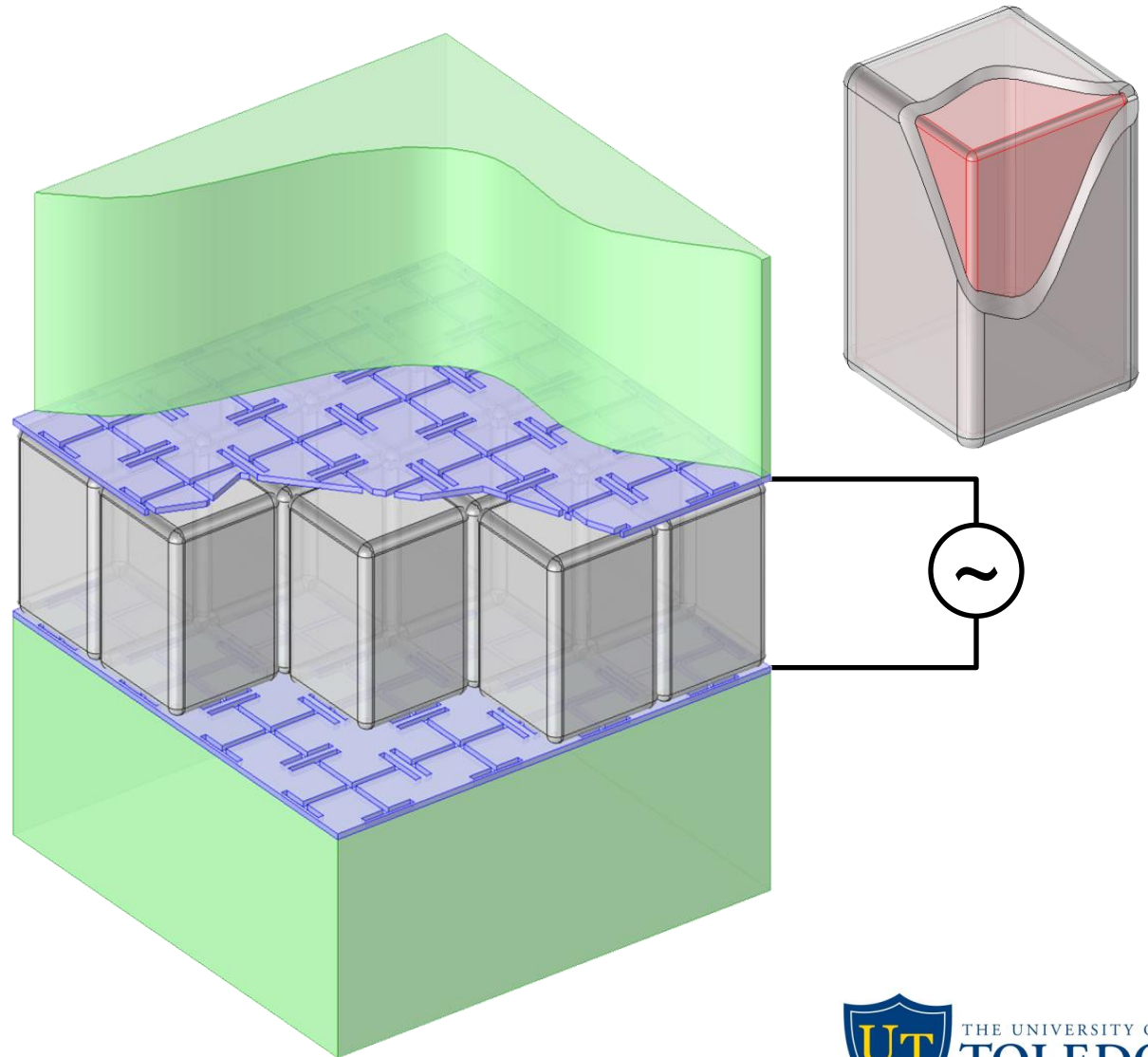
Dielectric

FSS

Plasma-shells

FSS

Dielectric

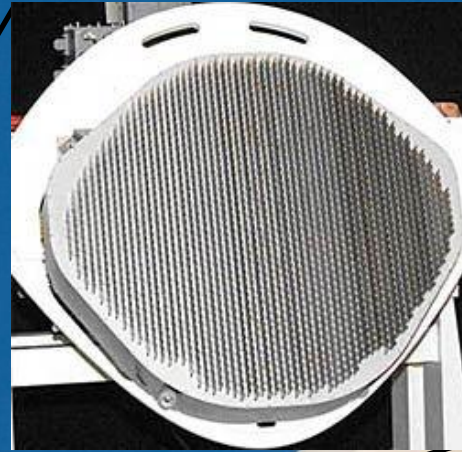
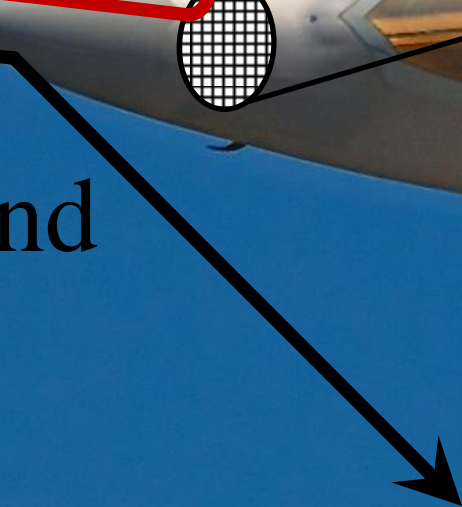


Radar Cross Section Reduction

In-Band



Out-of-Band



Radar Cross Section Reduction

In-Band



Out-of-Band

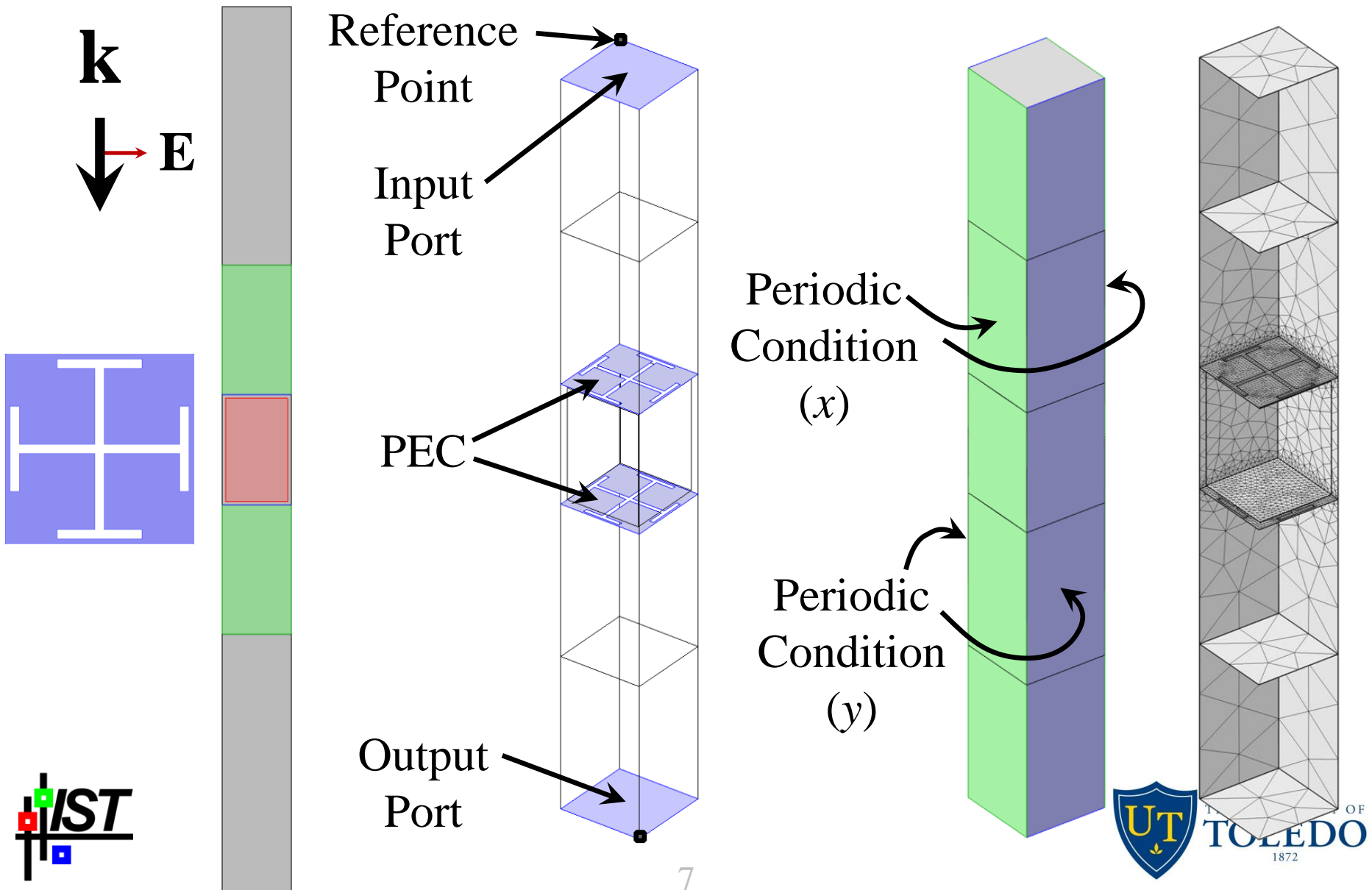
High-Power Threats



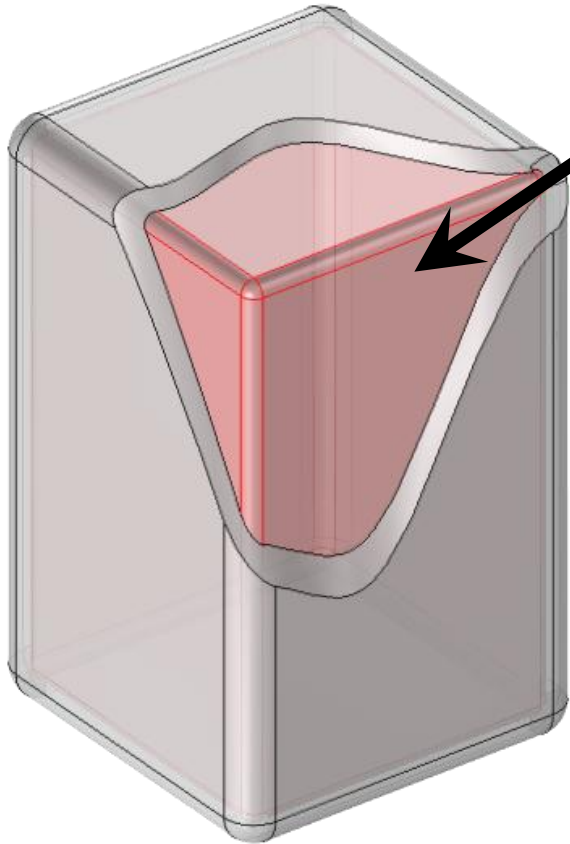
High-Power Threats



Component Setup



Plasma Complex Dielectric Material

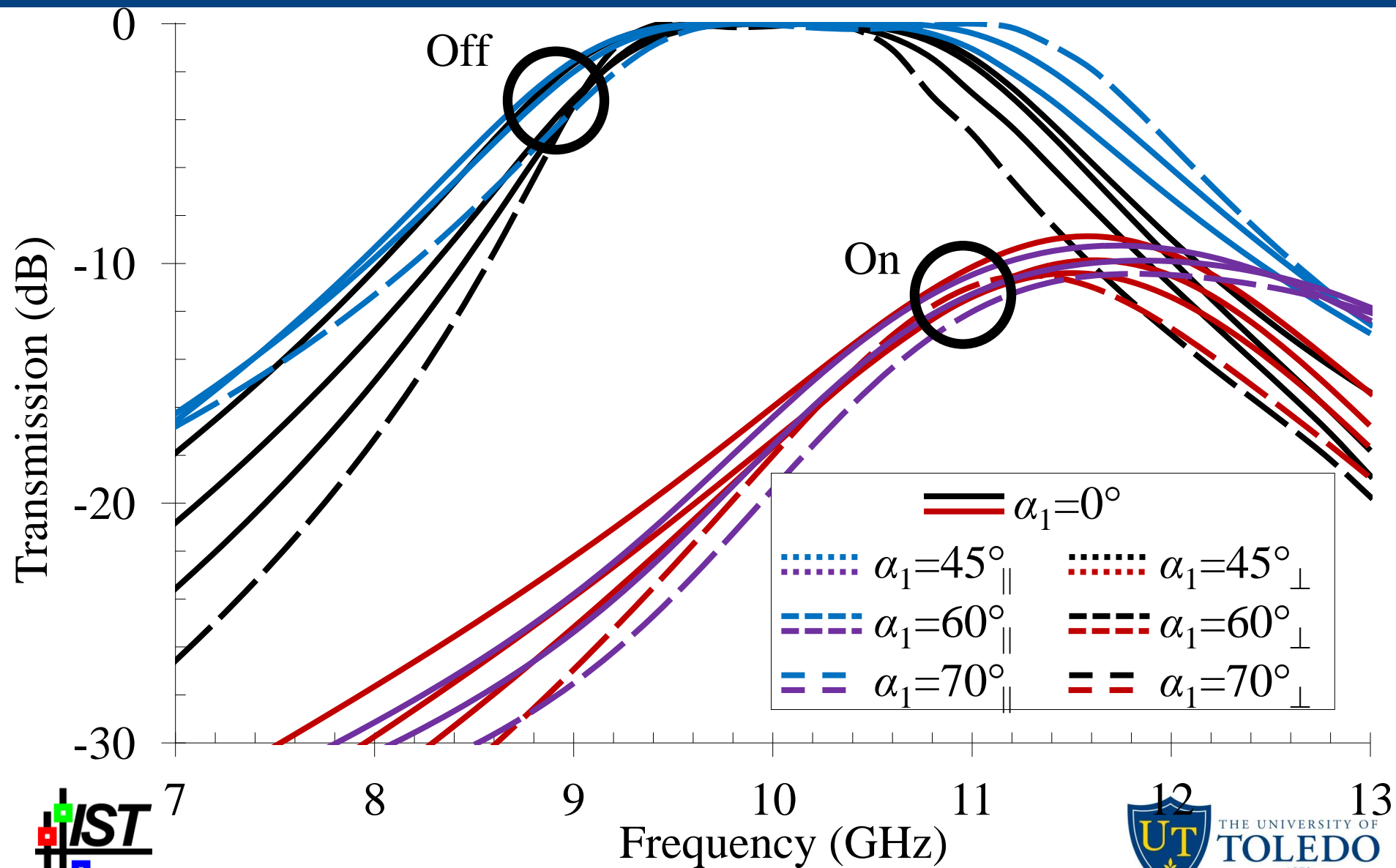


$$\epsilon = \epsilon_0 (\epsilon_r' - j\epsilon_r'')$$

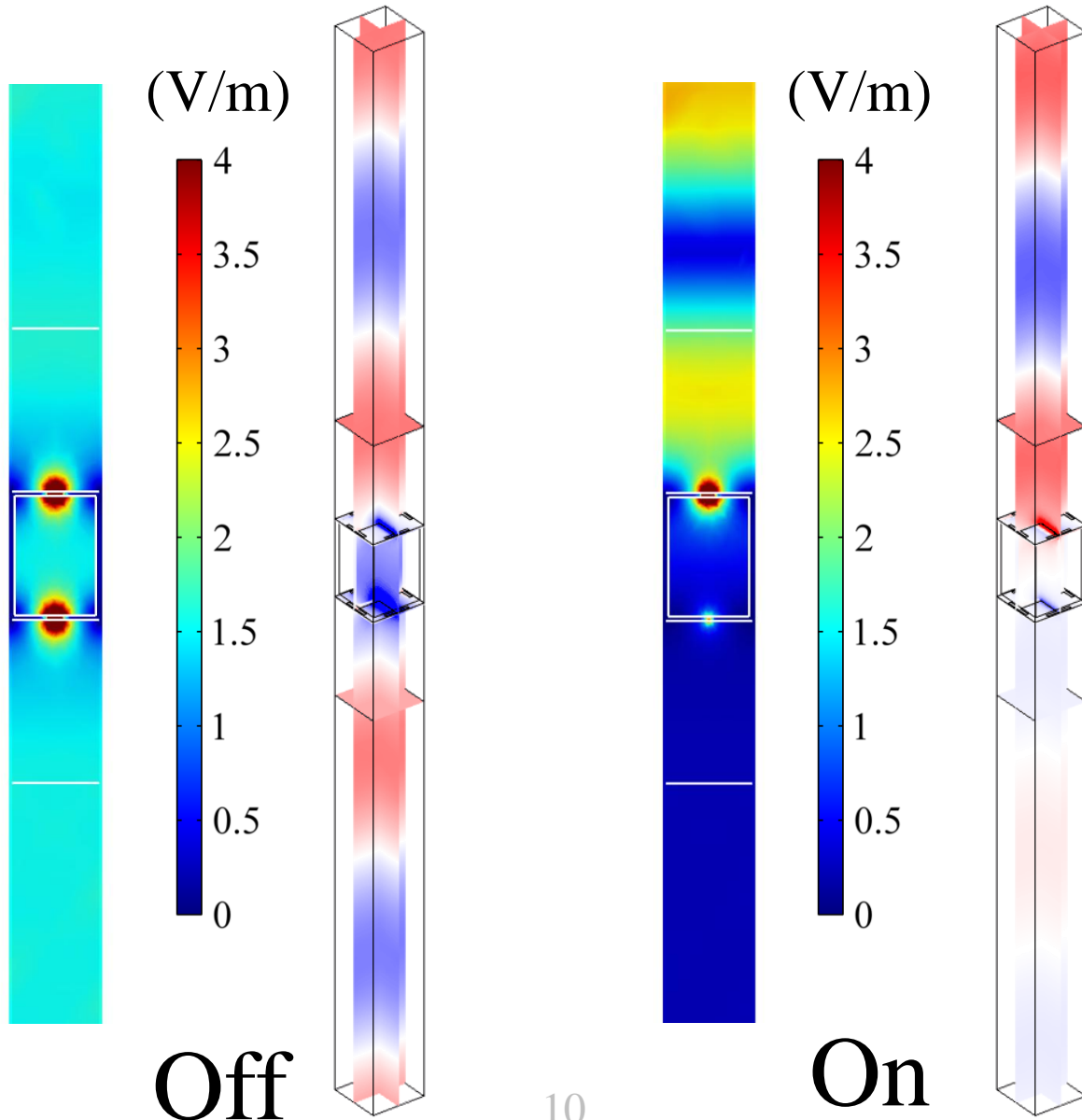
$$\epsilon_r' = 1 - \frac{\omega_p^2}{\omega^2 + \nu^2}$$

$$\epsilon_r'' = \frac{\omega_p^2 \nu / \omega}{\omega^2 + \nu^2}$$

Passband Performance



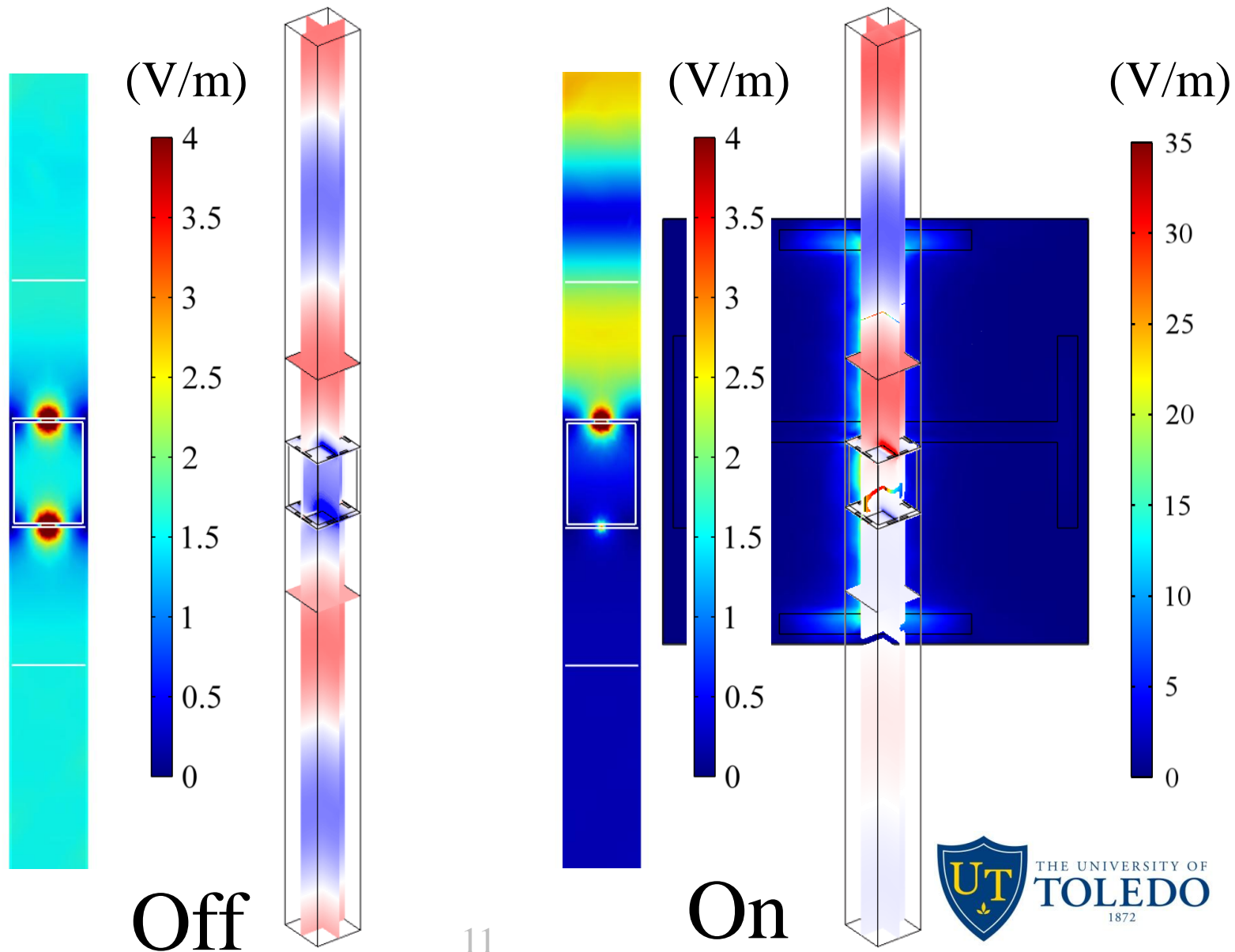
E-Field



Off

On

E-Field



Future Work

- Plasma modeling
 - Noble gases
 - RF sustaining
 - Microwave interaction
 - Time-domain turn on/turn off (modulation)
- Modes of operation
 - Total absorption
 - Stimulus responsive
- Conformal structures