
S3P - S Parameter

Advanced Computations

SLAC National Accelerator Laboratory

CW10, Stanford, September 20, 2010

S3P - Formulation

- The variational formulation

$$\int_{\Omega} \frac{1}{\mu_r} (\nabla \times \vec{E})^* \cdot (\nabla \times \vec{h}) dv - \frac{\omega^2}{c^2} \int_{\Omega} \vec{E}^* \cdot \vec{h} dv$$
$$= -i\omega\mu_0 \int_S (\vec{n} \times \vec{H}_{excit})^* \cdot \vec{h} ds$$

- Discretized form $(\mathbf{K} - \frac{\omega^2}{c^2} \mathbf{M}) \cdot \mathbf{x} = \mathbf{b}$

$$K_{mj} = \int_{\Omega} \frac{1}{\mu_r} (\nabla \times \vec{N}_m)^* \cdot (\nabla \times \vec{N}_j) dv$$

$$M_{mj} = \int_{\Omega} (\vec{N}_m \cdot \vec{N}_j) dv$$

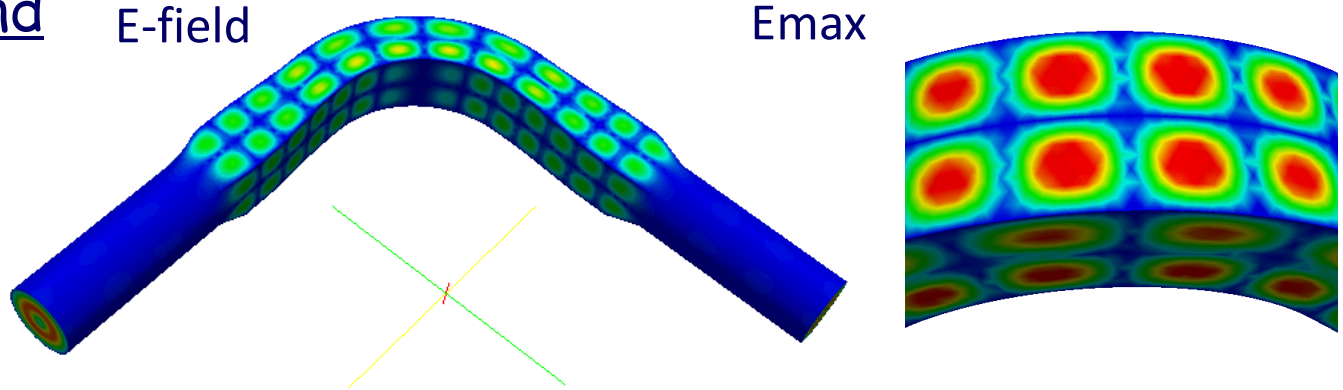
S3P - 90-Degree Bend & PBG Fiber

90-Degree Bend

Freq = 11.424GHz

$S_{11} = 0.0115$

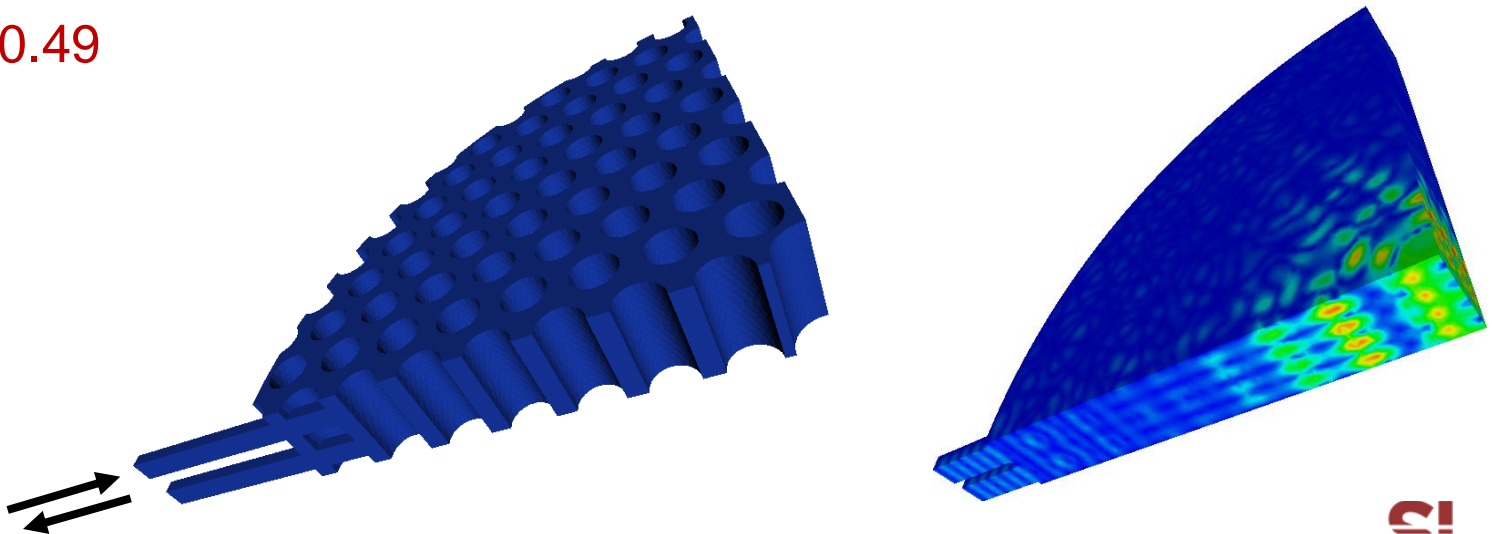
$S_{12} = 0.9963$



PBG Fiber

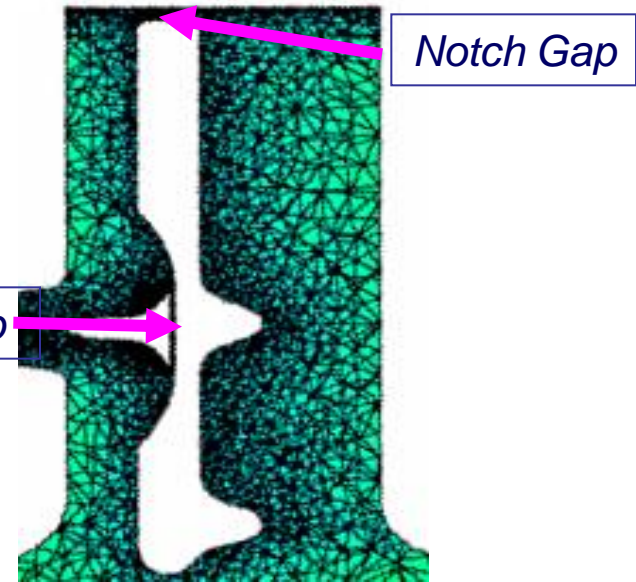
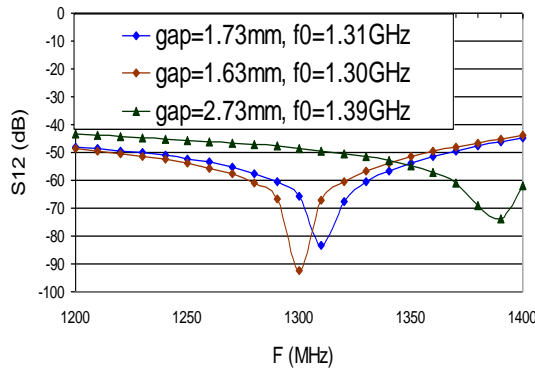
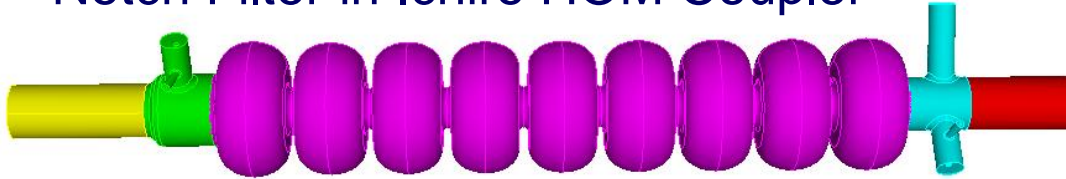
Mode driven in homogeneous waveguide

$S_{11} = 0.49$



S3P - ILC Notch Filter & LCLS Gun Window

Notch Filter in Ichiro HOM Coupler



LCLS RF Gun Dual-window assembly

