TERTIARY COLLIMATOR CHAMBER

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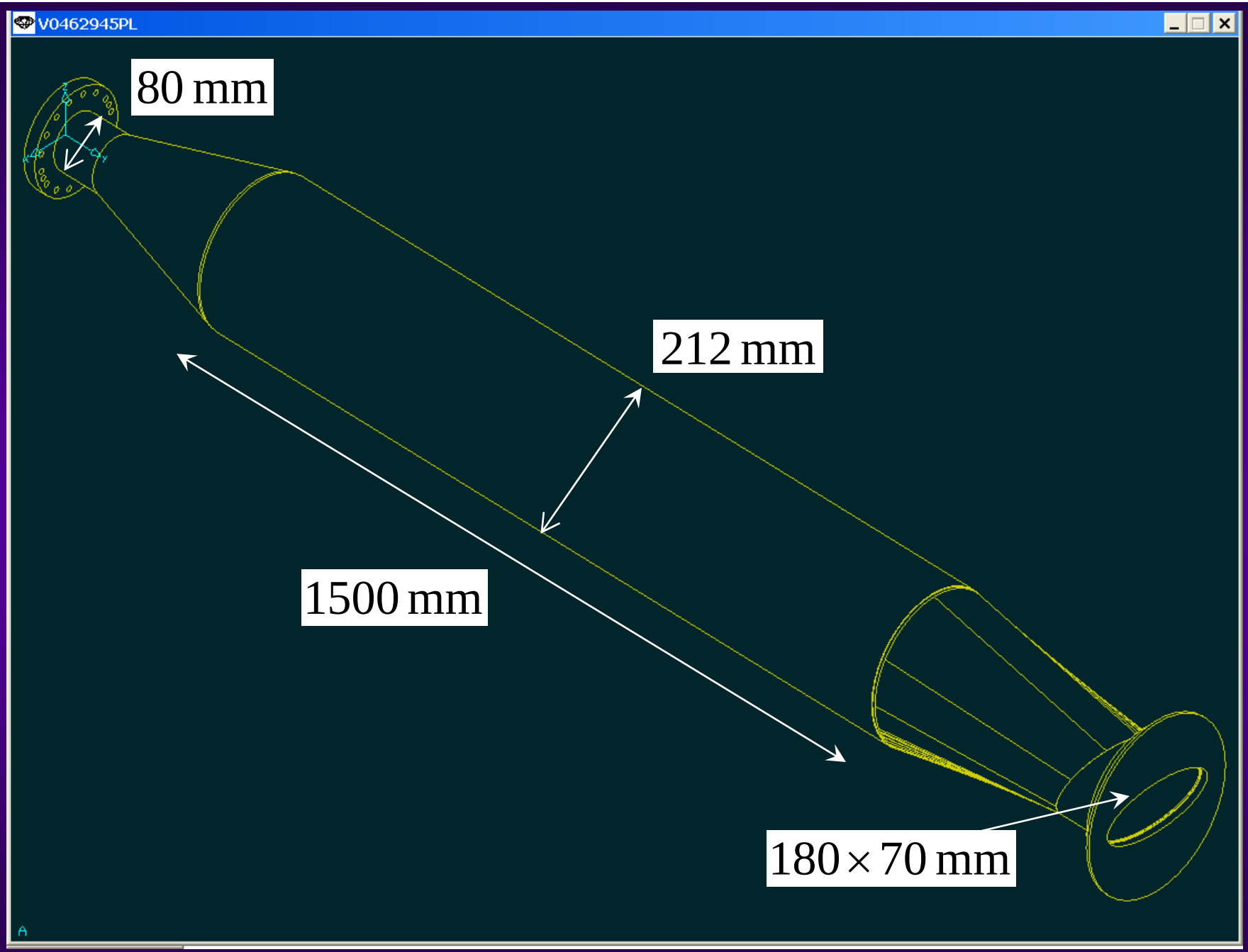
- **Email from Christian Rathjen on 06/10/05:**
  - **“The studies of the tertiary collimators at IR2 and IR8 have finally started. A current proposal requires a transition chamber between D1 and the TCTVB of about 2 m length (on the other side of the IP there is the TCDD). The collimator aperture is elliptical (180x70). Since we are short in time we would like to install a chamber of 212 inner diameter which is terminated on one side with a cone down to 80 mm and on the other side with a cone down to 180x70. The 212 mm part will be 1.5 m long”**
  - **Question: Does this "sausage" creates a resonator? (The alternative would be a hand made elliptical tube of 180x70 mm)”**


V0462945PL
80 mm
212 mm
1500 mm
180 × 70 mm

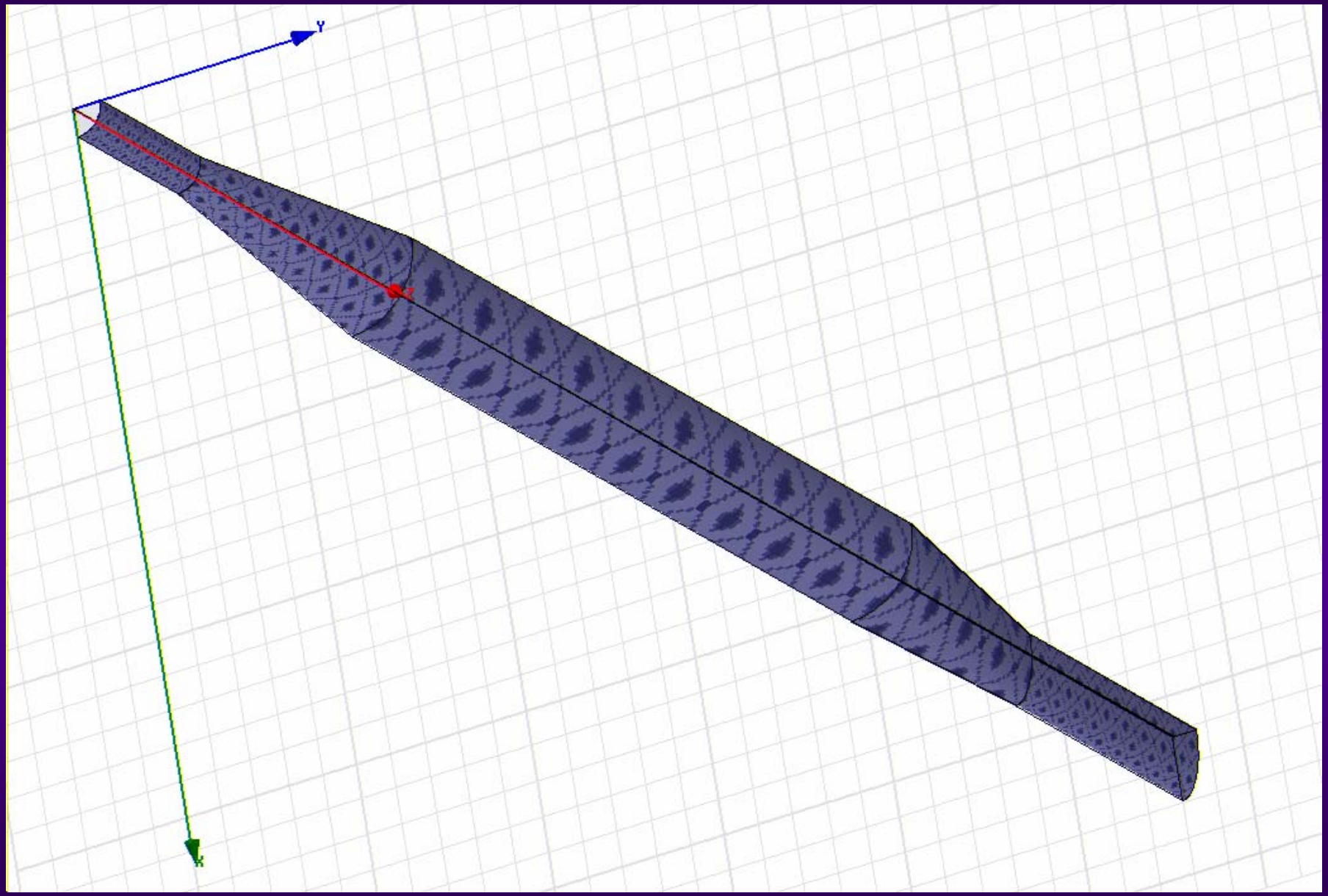
FIRST ROUGH ESTIMATE

- **Yes, this will create a resonator with frequencies above 1 GHz**

$$f_{cut-off}^{\text{1st long mode}}\,[\text{GHz}] \approx \frac{10}{b\,[\text{cm}]}$$

- **The alternative is better as no cavity is created**
- **However, even if we keep the first scenario, this should not be too harmful as the frequencies are high**
- **To have an exact evaluation of the power loss, HFSS simulations are required**

HFSS SIMULATIONS (1/7)

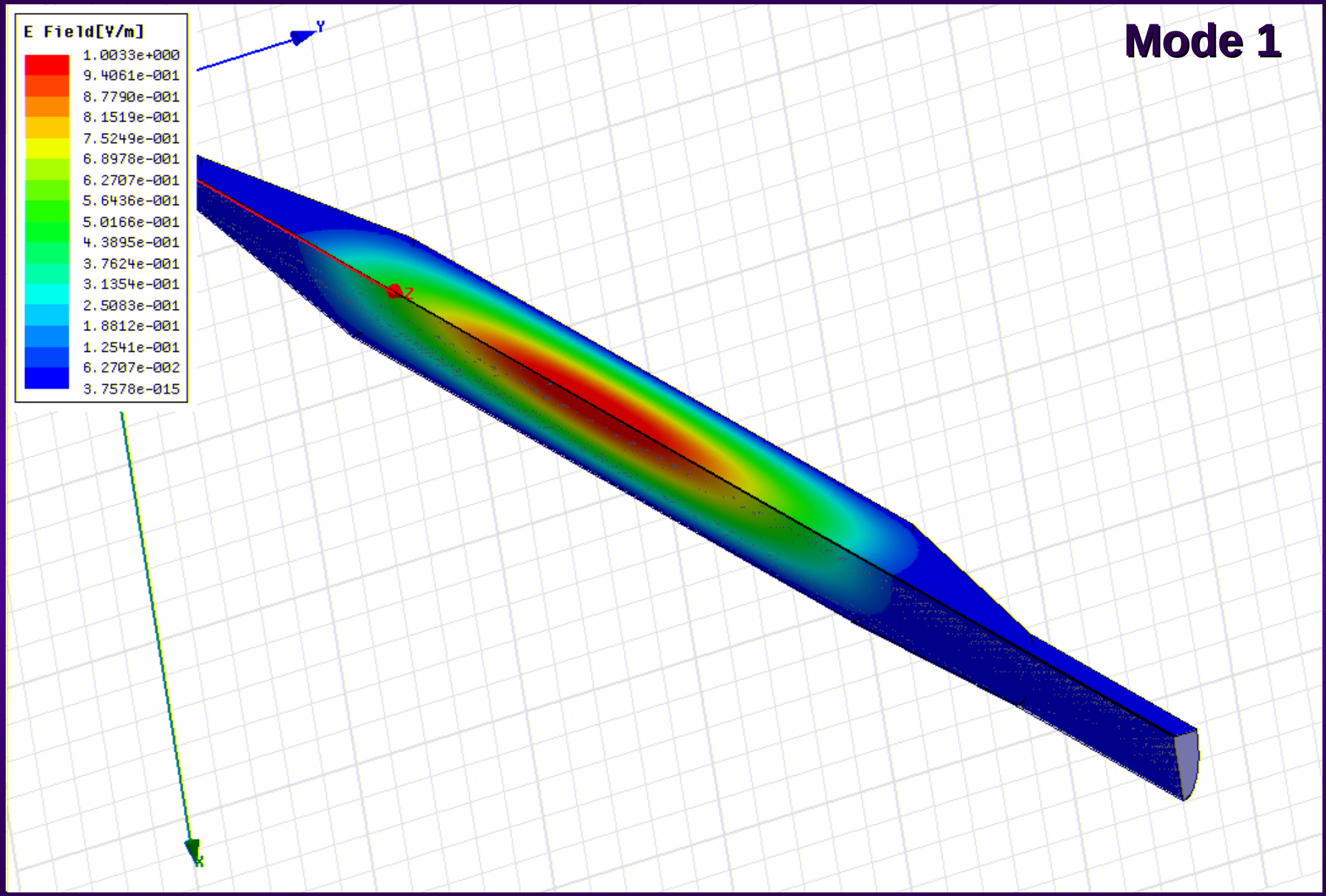


HFSS SIMULATIONS (2/7)

GHz

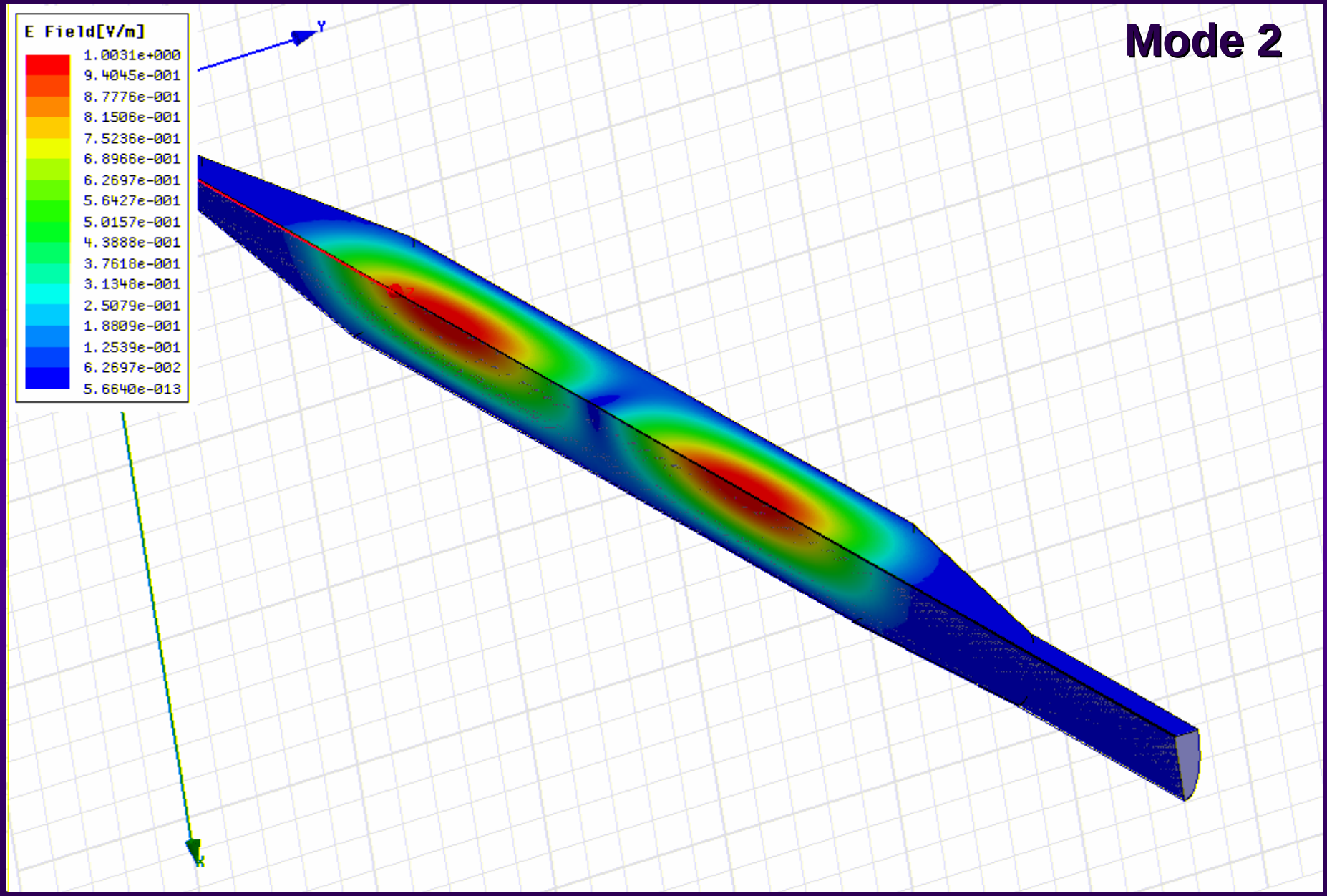
$f_{r1} = 1.0857$	$Q_1 = 7113.9$	$R_i = ?$
$f_{r2} = 1.0948$	$Q_2 = 7120.3$	
$f_{r3} = 1.1098$	$Q_3 = 7135.9$	
$f_{r4} = 1.1305$	$Q_4 = 7158.7$	
$f_{r5} = 1.1565$	$Q_5 = 7194.1$	
$f_{r6} = 1.1872$	$Q_6 = 7374.7$	
$f_{r7} = 1.2218$	$Q_7 = 8914.4$	
$f_{r8} = 1.2596$	$Q_8 = 4488.6$	
$f_{r9} = 1.3000$	$Q_9 = 1743.3$	
$f_{r10} = 1.3474$	$Q_{10} = 2220.0$	

HFSS SIMULATIONS (3/7)

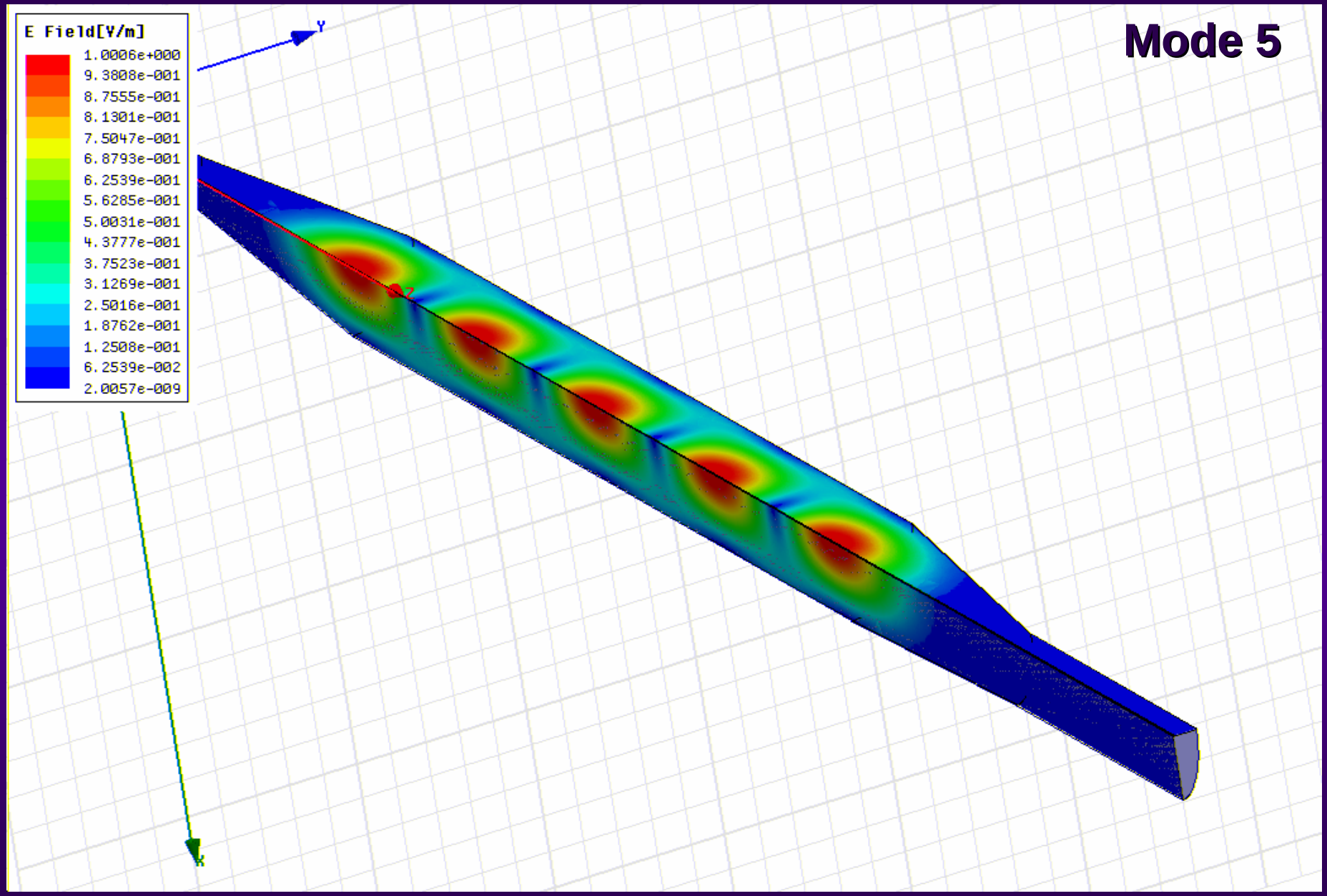


Mode 1

HFSS SIMULATIONS (4/7)

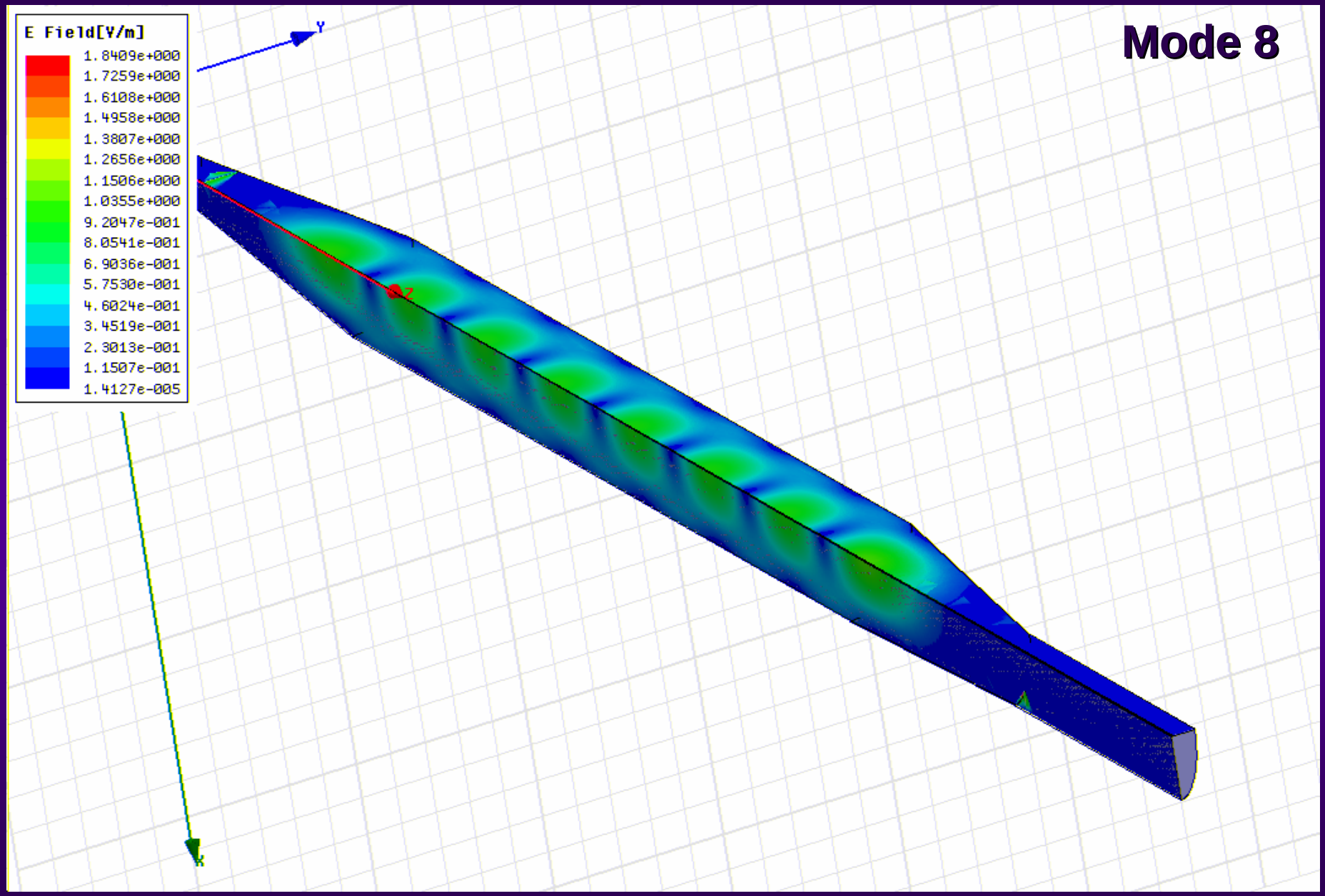


HFSS SIMULATIONS (5/7)



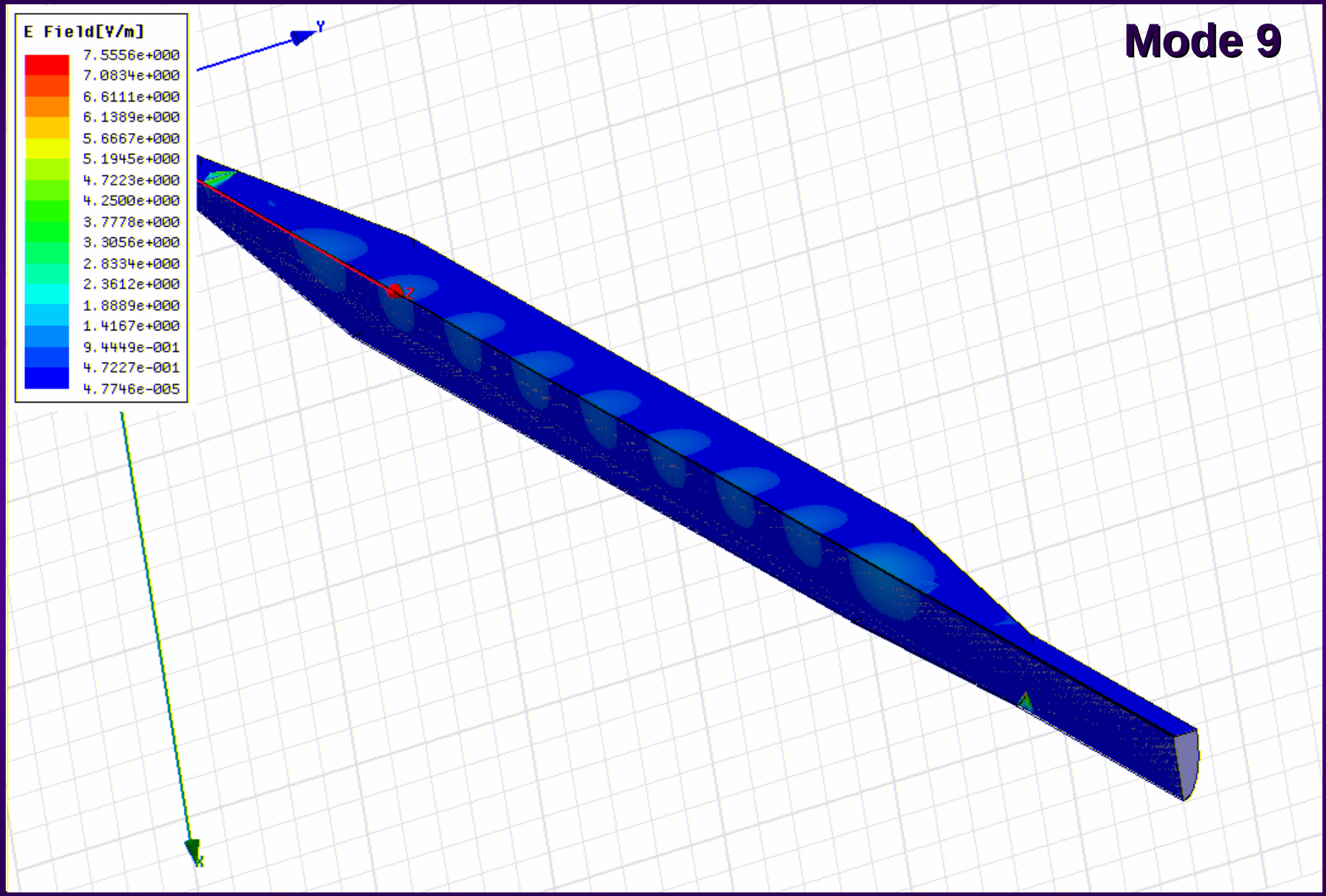
Mode 5

HFSS SIMULATIONS (6/7)



Mode 8

HFSS SIMULATIONS (7/7)



Mode 9