Detected Resonant Frequencies (0-200 Hz):
  88
  124
  146
  186

Estimated Damping Ratios:
  Mode near 88.00 Hz → ζ = 0.0341
  Mode near 124.00 Hz → ζ = 0.0565
  Mode near 146.00 Hz → ζ = 0.0205
  Mode near 186.00 Hz → ζ = 0.0323

Normalized Mode Shapes (0-200 Hz):

Mode at 88.00 Hz:
 X: 0.131∠171.4°
 Y: 1.000∠174.3°
 Z: 0.107∠-147.4°

Mode at 124.00 Hz:
 X: 0.075∠49.9°
 Y: 0.159∠49.3°
 Z: 1.000∠-130.0°

Mode at 146.00 Hz:
 X: 0.040∠-55.9°
 Y: 1.000∠-98.6°
 Z: 0.459∠-173.5°

Mode at 186.00 Hz:
 X: 0.078∠-81.8°
 Y: 0.553∠127.9°
 Z: 1.000∠138.9°
=== Modal Parameter Summary (0-200 Hz) ===

Freq_Hz	Damping	Phi_X	Phi_Y	Phi_Z
88	0.034091	-0.12977+0.019677i	-0.99504+0.099481i	-0.089853-0.057569i

124	0.056452	0.047987+0.057062i	0.1039+0.12058i	-0.64323-0.76568i
146	0.020548	0.022211-0.032751i	-0.14924-0.9888i	-0.45621-0.052254i
186	0.032258	0.011122-0.076987i	-0.33955+0.43625i	-0.75316+0.65783i

Detected Resonant Frequencies (0-200 Hz):
  88
 124
 146
 186

Estimated Damping Ratios:
  0.0341
  0.0565
  0.0205
  0.0323

=== Modal Summary (0-200 Hz) ===
Mode 1: f=88.00 Hz, Damping=0.0341, k_dyn_X=234167894.33 N/m, k_dyn_Y=30736035.57 N/m, k_dyn_Z=288023107.32 N/m
  Mode Shape (X,Y,Z): 0.131∠171.4°, 1.000∠174.3°, 0.107∠-147.4°
Mode 2: f=124.00 Hz, Damping=0.0565, k_dyn_X=102809093.74 N/m, k_dyn_Y=48157725.95 N/m, k_dyn_Z=7665251.97 N/m
  Mode Shape (X,Y,Z): 0.075∠49.9°, 0.159∠49.3°, 1.000∠-130.0°
Mode 3: f=146.00 Hz, Damping=0.0205, k_dyn_X=584791549.90 N/m, k_dyn_Y=23141428.33 N/m, k_dyn_Z=50396318.68 N/m
  Mode Shape (X,Y,Z): 0.040∠-55.9°, 1.000∠-98.6°, 0.459∠-173.5°
Mode 4: f=186.00 Hz, Damping=0.0323, k_dyn_X=798828559.75 N/m, k_dyn_Y=112402740.39 N/m, k_dyn_Z=62138188.81 N/m
  Mode Shape (X,Y,Z): 0.078∠-81.8°, 0.553∠127.9°, 1.000∠138.9°