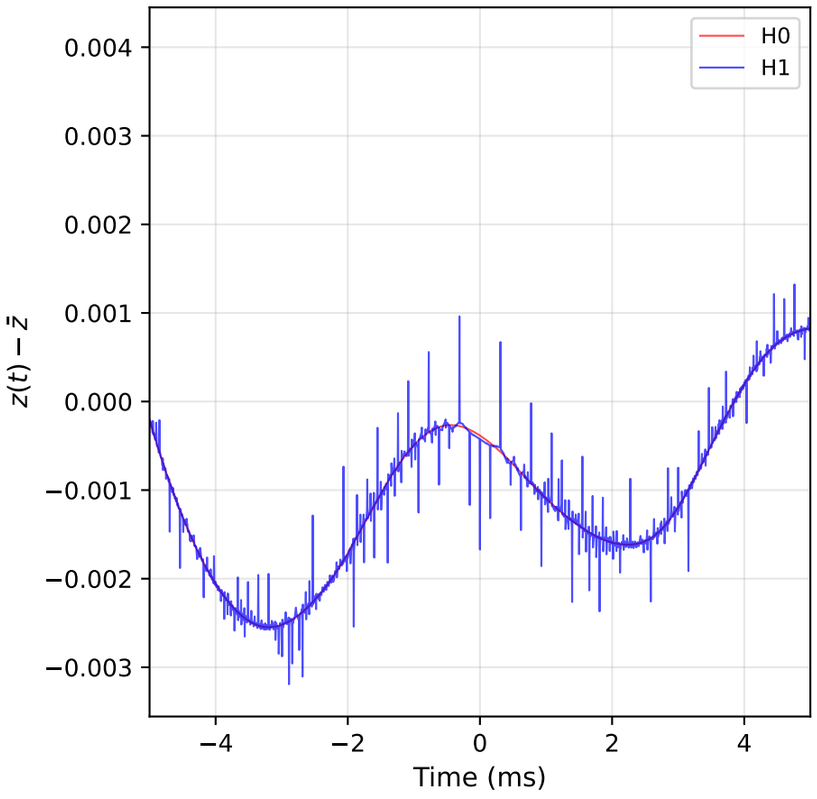

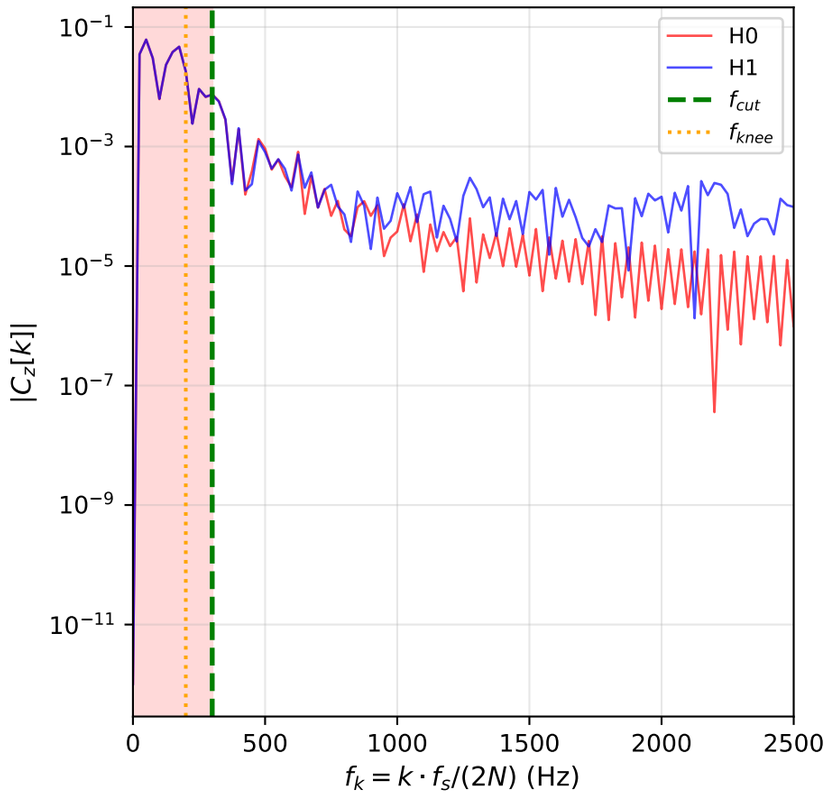

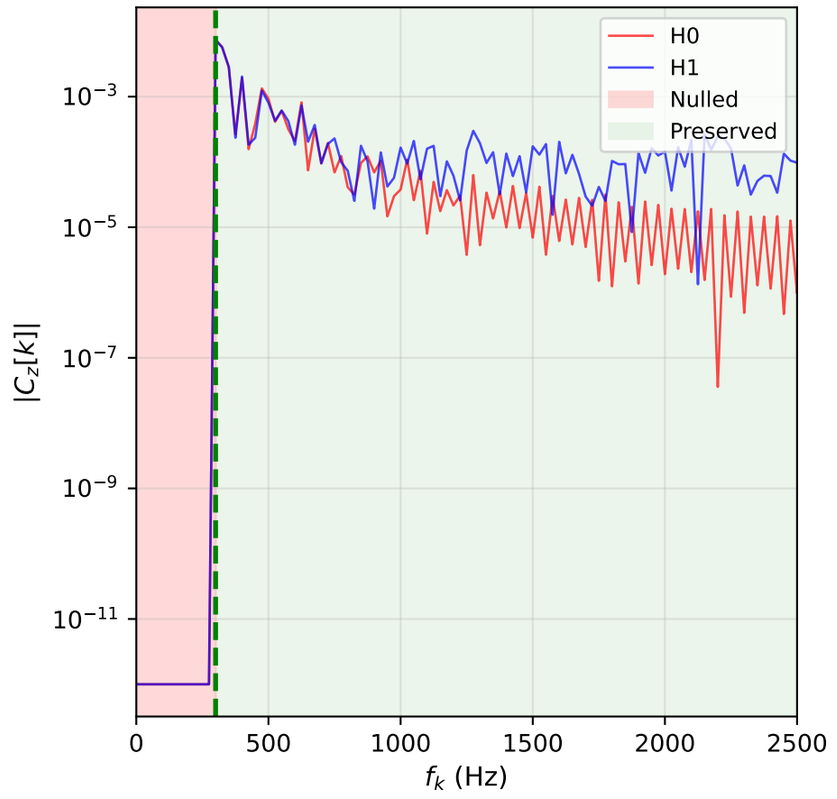

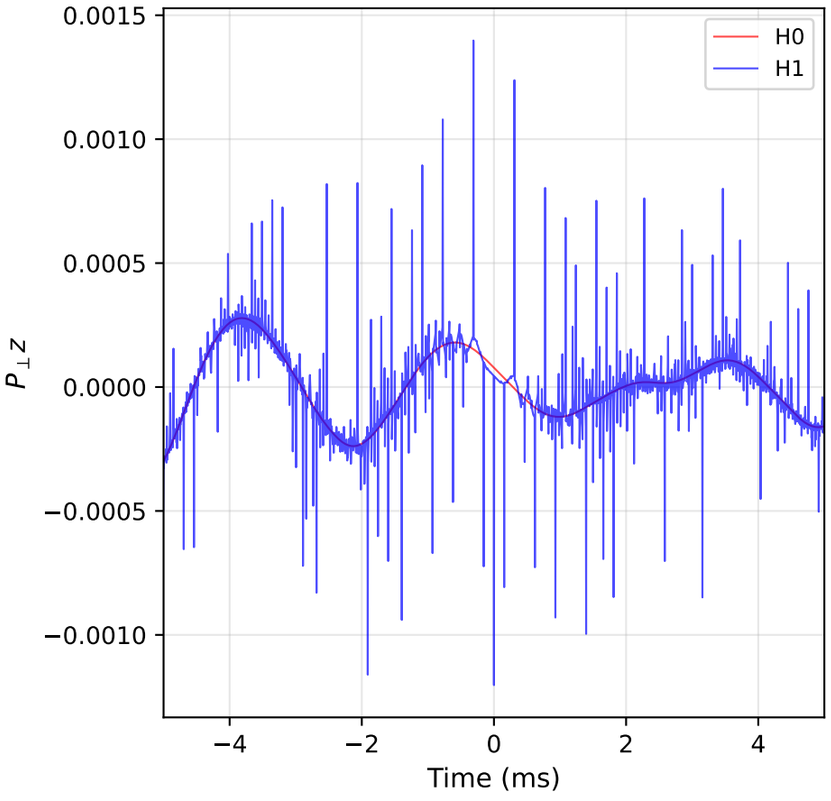

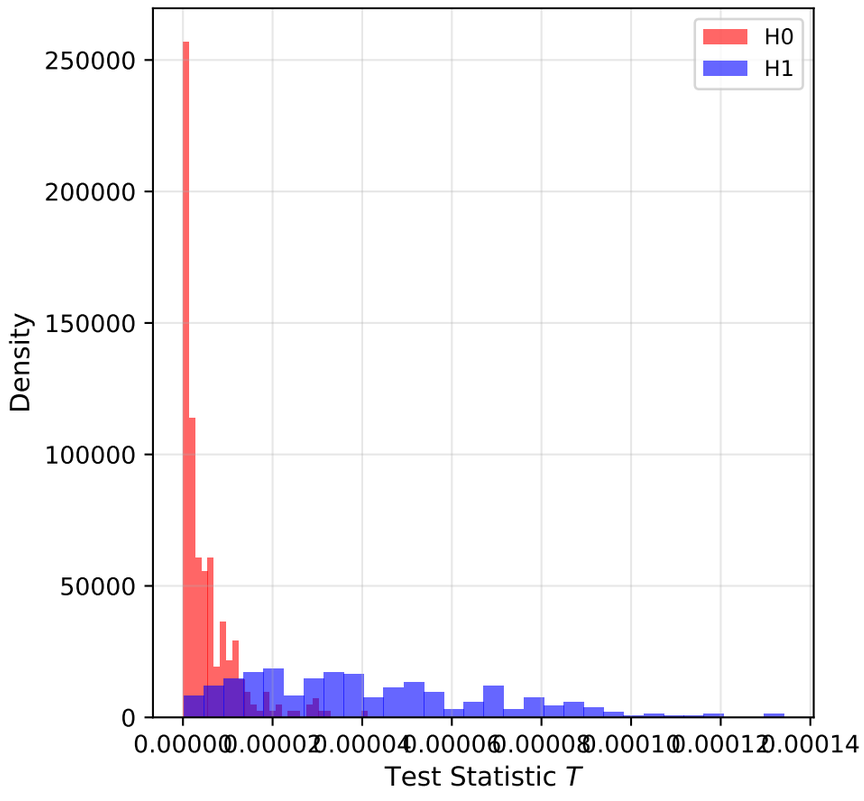

(f) Design Summary

```
SURVIVAL SPACE DESIGN (FINAL)

Physical Parameters:
  - Fresnel radius: r_F = 4.47 m
  - Crossing time: T_cross = 0.60 ms
  - Signal bandwidth: f_max = 1677 Hz

Projection Operator P_perp:
  - Nulls DCT coefficients for f < f_cut
  - Frequency mapping: f_k = k*fs/(2N)
  - Preserved subspace: [f_cut, fs/2]

Design Choice: f_cut = 300 Hz
  - Condition: f_knee < f_cut << f_max
  - f_cut/f_knee = 1.5 (noise margin)
  - f_cut/f_max = 0.18 (signal margin)

Key Metrics (f_cut = 300 Hz):
  - Signal retention: eta_z > 99%
  - Noise removed: rho = 99.1%
  - Detection AUC = 0.940 (SNR=50dB)

Working Range:
  f_knee < f_max/3 = 559 Hz
```