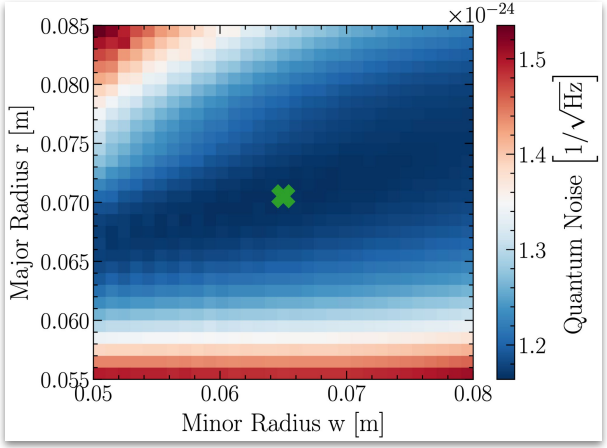
Multi-Ring FROSTI with Grid Search

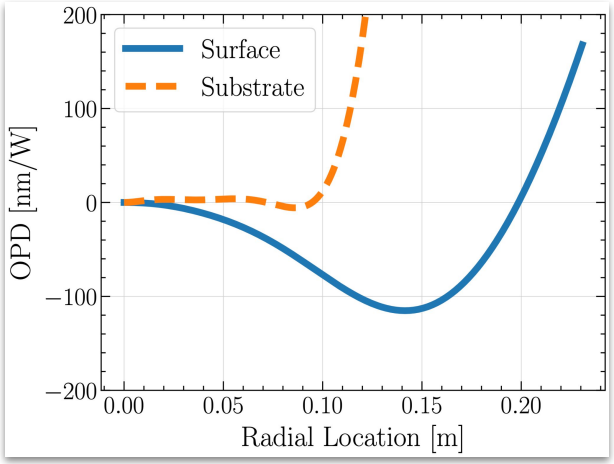
	Lower Bound	Upper Bound	Steps
Major Radius [cm]	5.5	8.5	30
Minor Radius [cm]	5	8	30
FROSTI Power [W]	10	40	30



Optimal quantum noise at 1.5 MW

The RH power is optimized to completely remove the quadratic component the substrate OPD

In total, there are 30*30*30 = 27000 cases, which takes ~20 hrs over 45 cores.



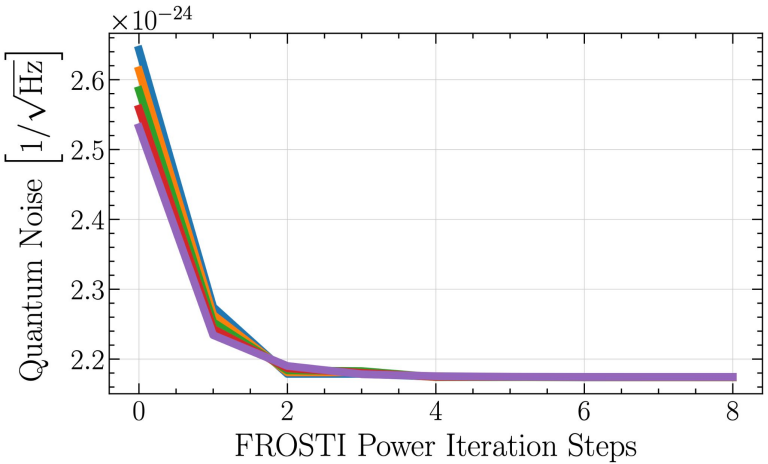
Large Residual Wavefront RMS Error

Grid-Search Study for FROSTI A+

Grid Search over Single Component FROSTI Parameters

	Lower Bound	Upper Bound	Steps
Major Radius [cm]	5.5	8.5	45
Minor Radius [cm]	5	8	45

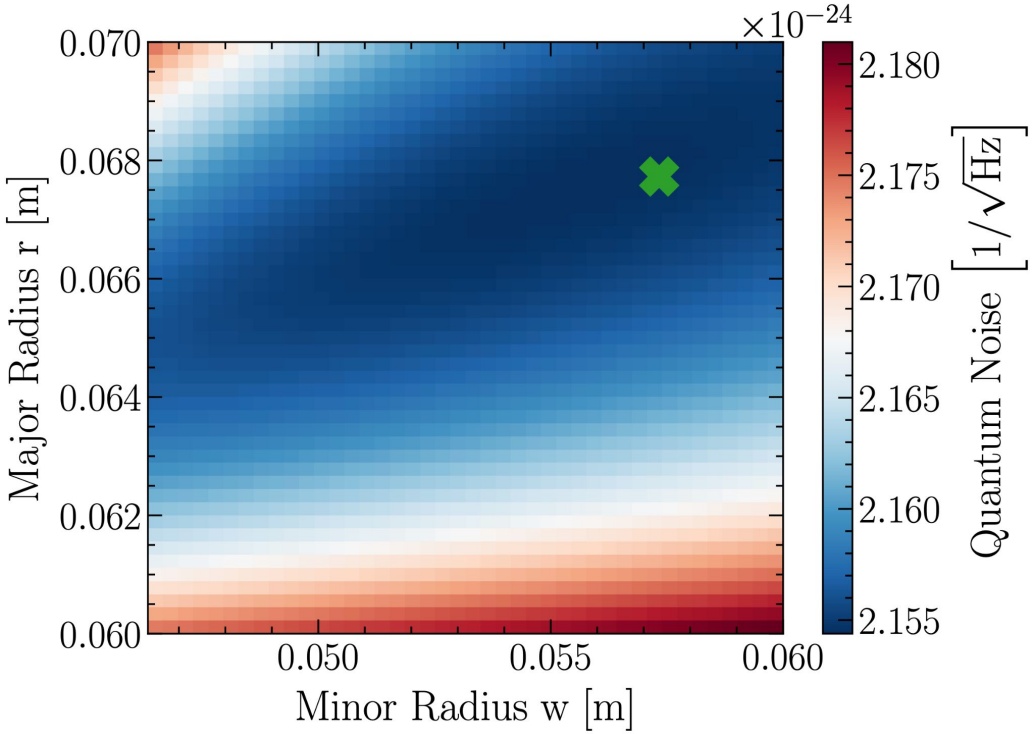
Example convergence over FROSTI power optimization

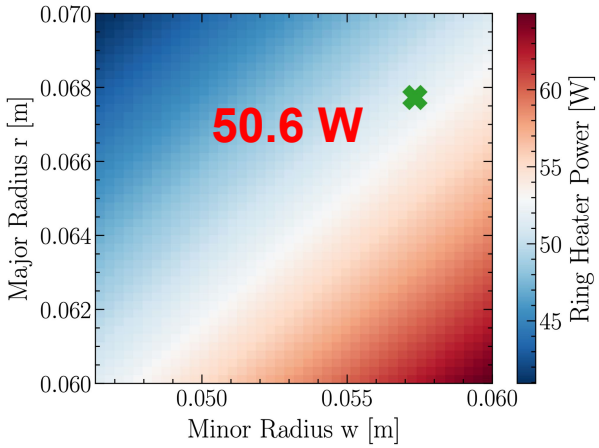


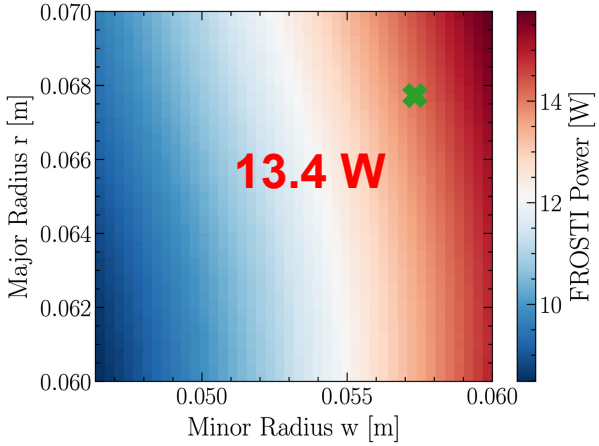
The RH power is optimized to completely remove the quadratic component the substrate OPD

The FROSTI power is optimized based on the quantum noise (8 steps max)

In total, there are 45*45 = 2025 cases, which takes ~40 hrs over 45 cores.

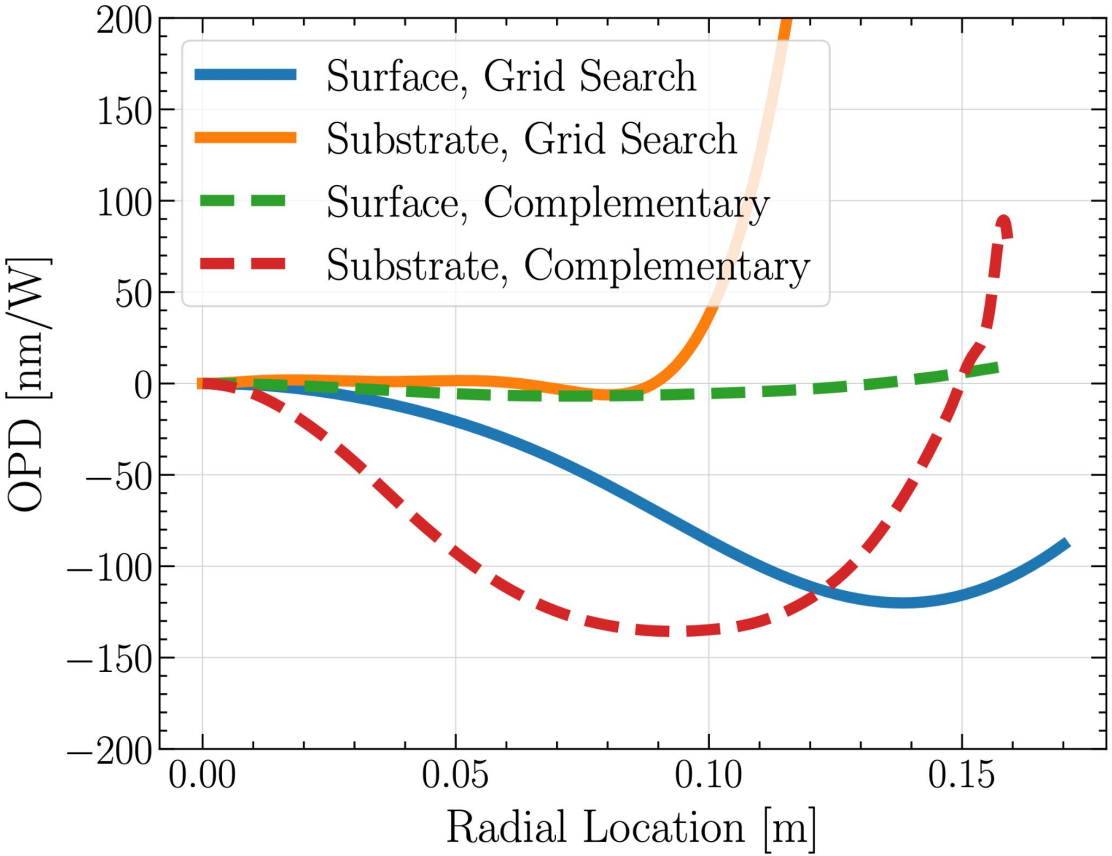


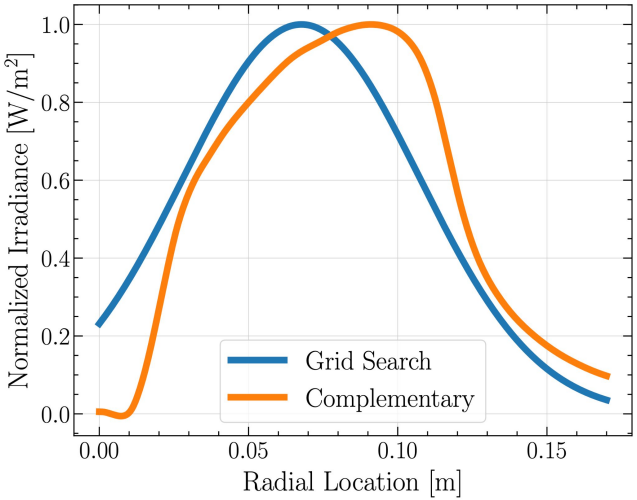




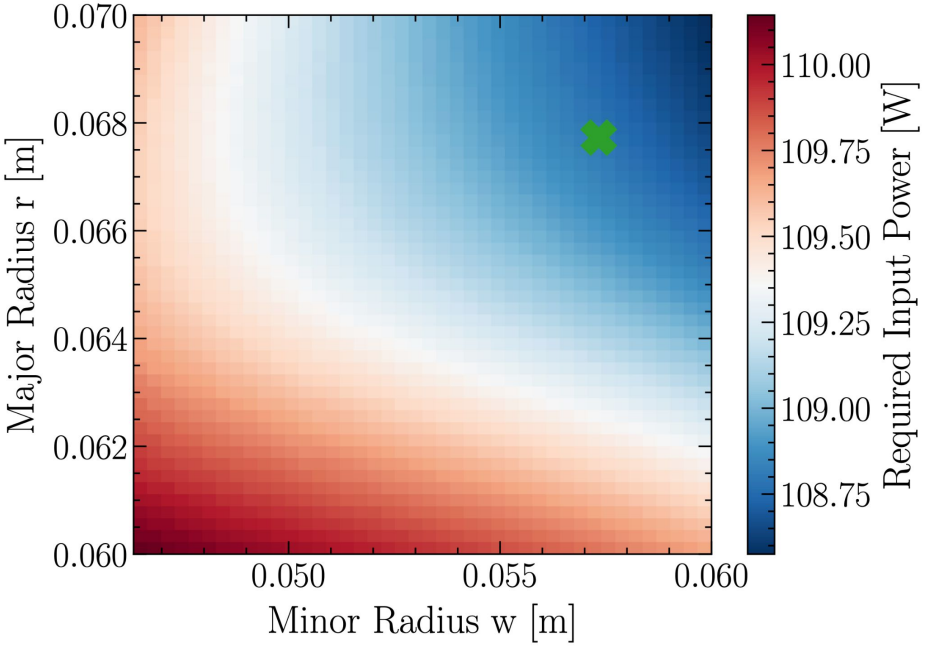
	Optimal QN (green cross)	Cold State
QN [1/rt(Hz)]	2.154e-24	2.148e-24

Grid search vs. complementary for A+





1. Grid search has flat substrate OPD near the center but larger at outside and surface OPD
2. Complementary case has flat surface but larger substrate OPD
3. Optimals profiles are similar



Required input power for reaching 750 kW

Observed squeezing with 7.5 dB of input squeezing