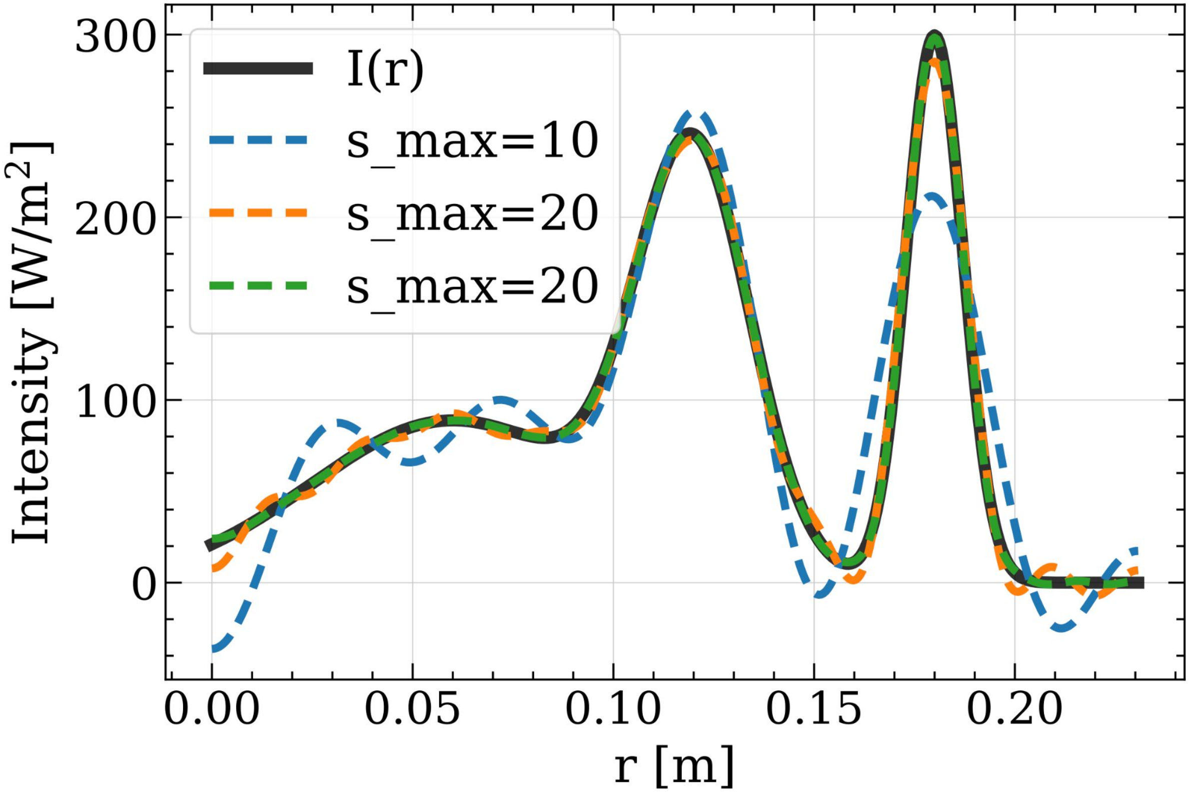
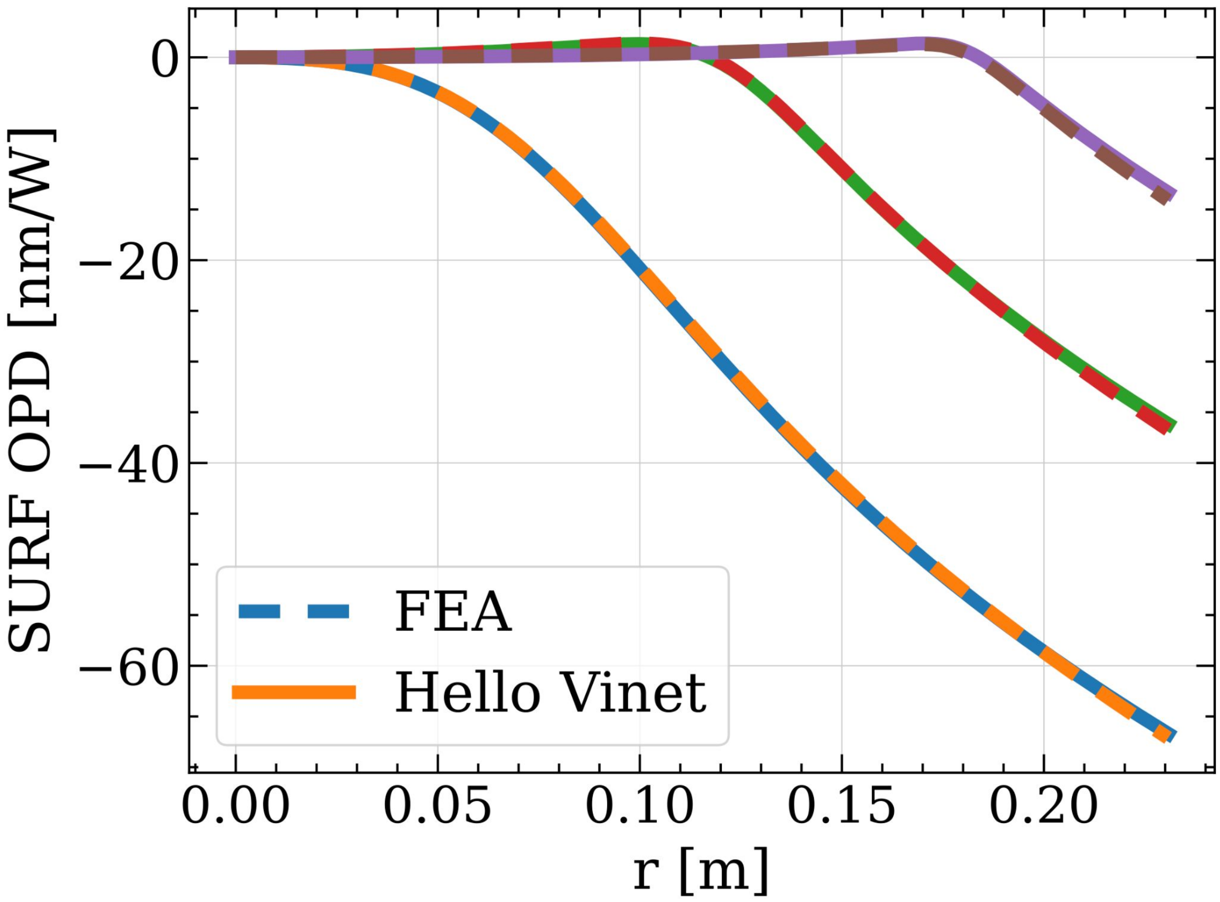
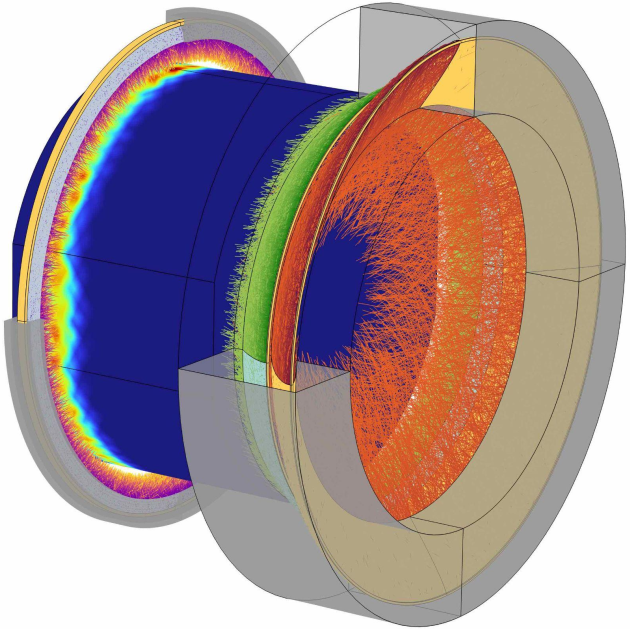


1. Hello-Vinet formulisms for **axisymmetric** heating profiles by **Fourier-Bessel** expansion.
2. S = 30 is enough to capture typical FROSTI irradiance with 3 components.



1. Hello-Vinet formulisms for **axisymmetric** heating profiles by **Fourier-Bessel** expansion.
2. H-V with S = 30 produces similar thermal responses as FEA models.

Multi-Ring FROSTI Design for $A^{\#}$ and CE



Design parameter space optimization

To minimize both the surface and subtract wavefront RMSE, with at least two FROSTI-like heater rings, we have

1. Width, location and individual power for each irradiance ring, DoF=2*3=6;
2. Ring heater power, DoF=1;
3. In total 7D parameter space exploration.

Geometric param:
1. Width
2. location

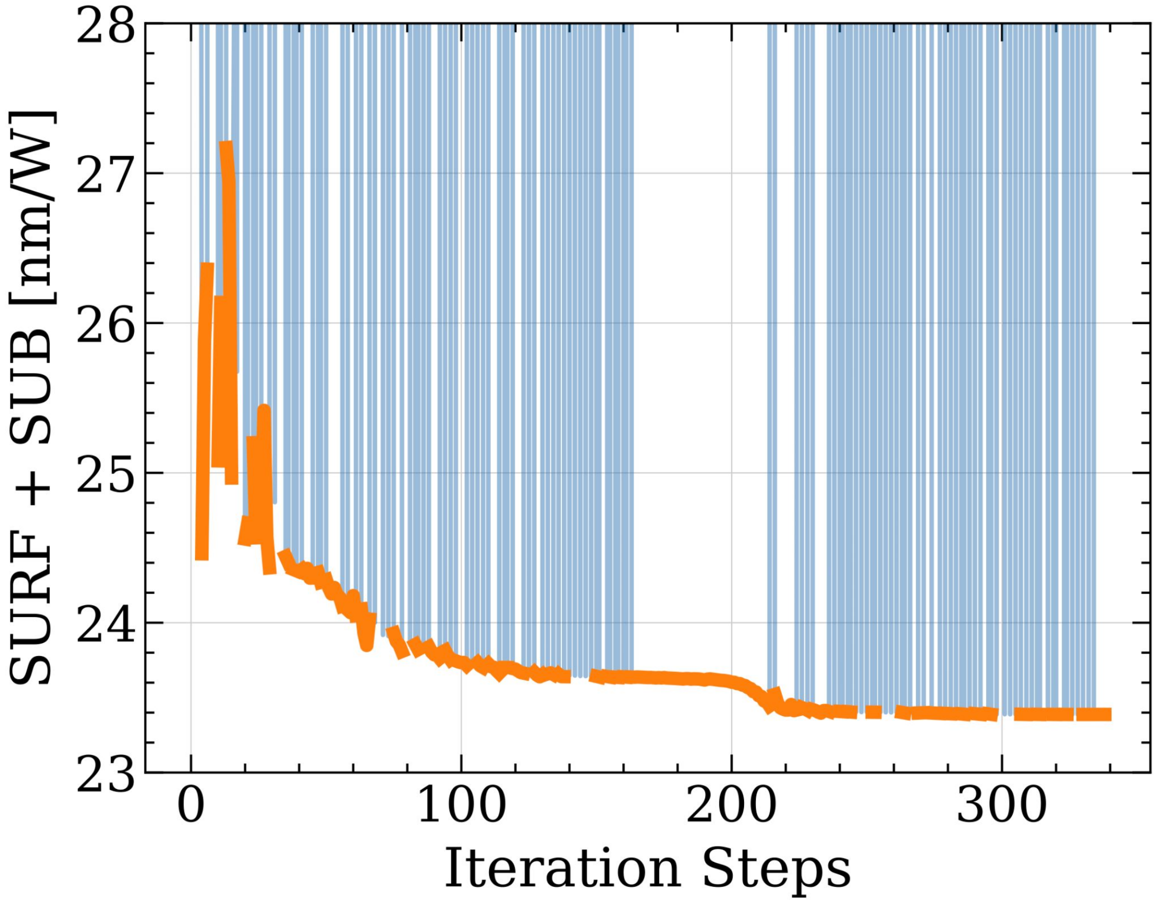
Optimization One

Nested loop

Power param:
1. FROSTI power
2. RH power

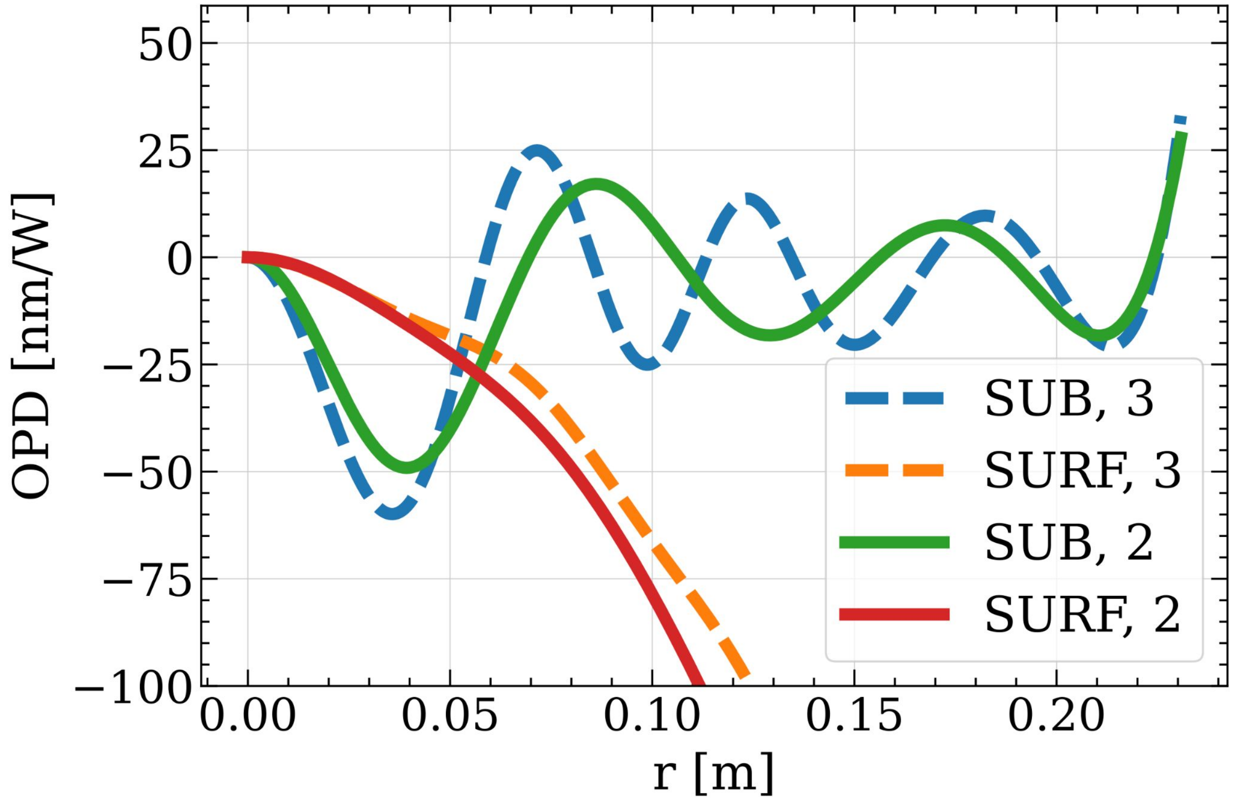
Optimization Two

For each step in optimization loop one, we need to run an FEA model over the width and locations.



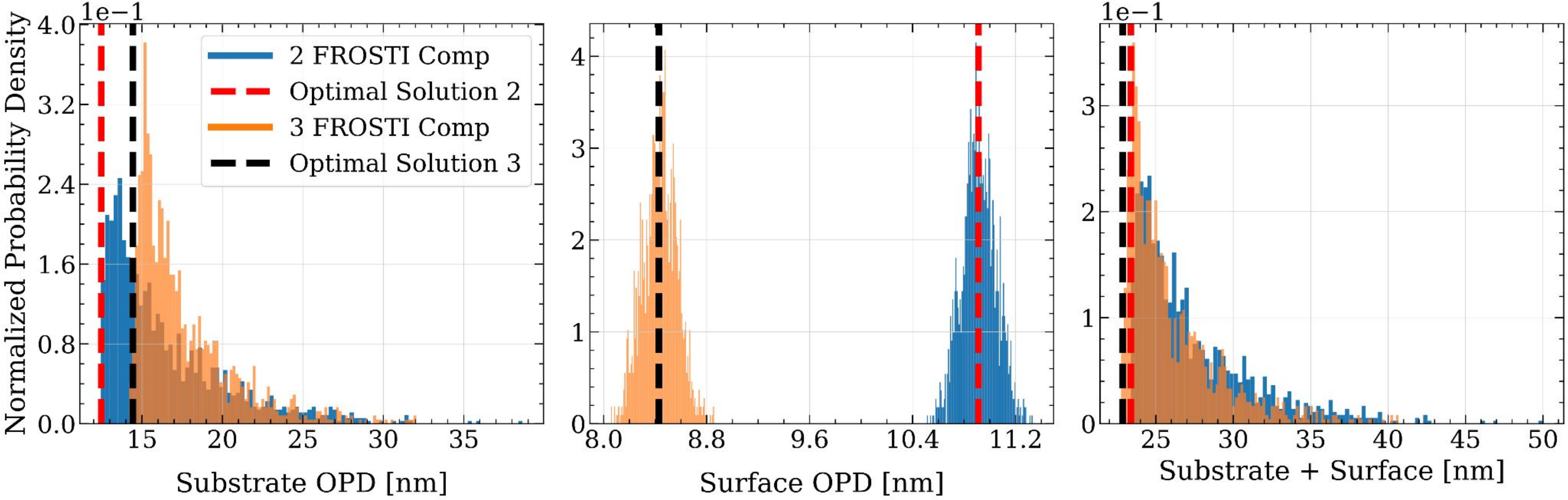
An example optimization process:

We first use particle swarm optimization to get us close to the optimum (finds the right valley), then we switch to SciPy local optimizer (descends to the bottom)



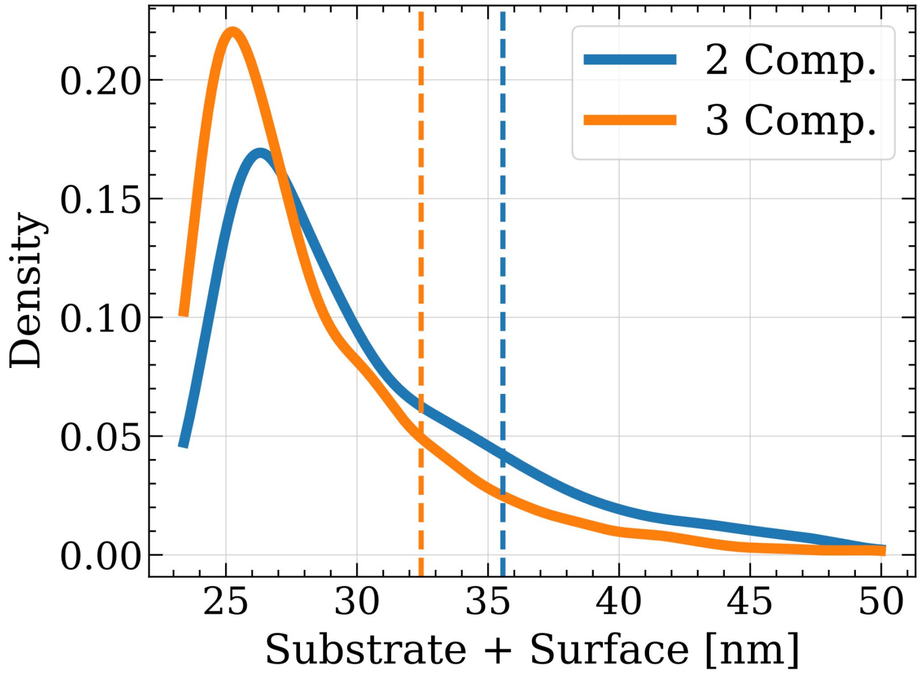
Optimization results for multi-ring FROSTI with 2/3 components:

	Sub. (nm)	Surf. (nm)
2 comp.	12.5	10.9
3 comp.	14.4	8.4
	Full Aperture	Gaussian Weighted



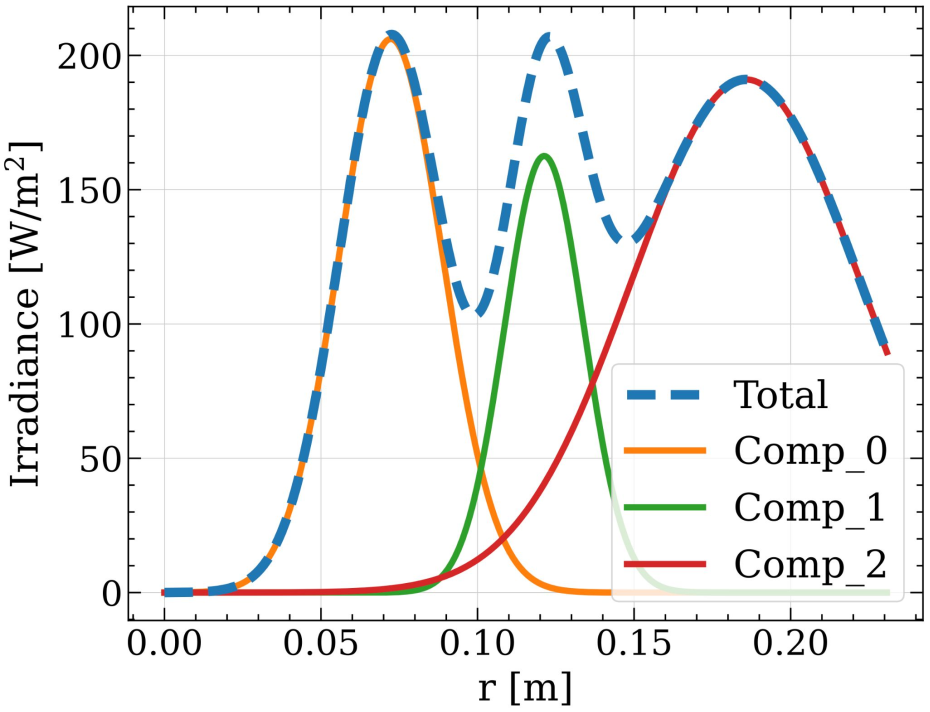
Power uncertainty for each FROSTI component: 0.1%,
Position/Width uncertainty for each FROSTI component: 1 mm.

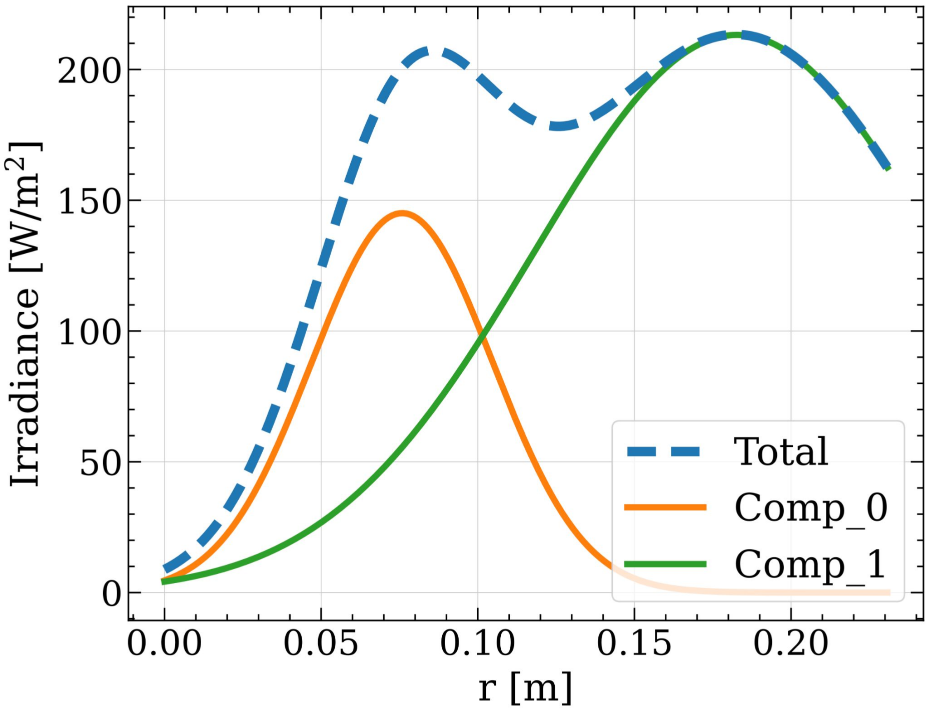
Two component solution is more susceptible to realistic errors.



Two component solution is more susceptible to realistic errors:

95th percentile value larger by 3 nm.





FROSTI Powers: 3.9 W, 4.0 W, 20.4 W
RH Power: 29.8 W

FROSTI Powers: 5.0 W, 40.0 W
RH Power: 35.2 W

1. Individual power too large?
2. Larger power loss at the edges
3. Larger realistic error tolerance.