EBSL1-ID18

Heat-load management

Notes on comparison between SRW and SRCALC

Juan Reyes Herrera

Advanced Analysis & Precision Unit, MEG/ISDD ESRF

juan.reyes-herrera@esrf.fr

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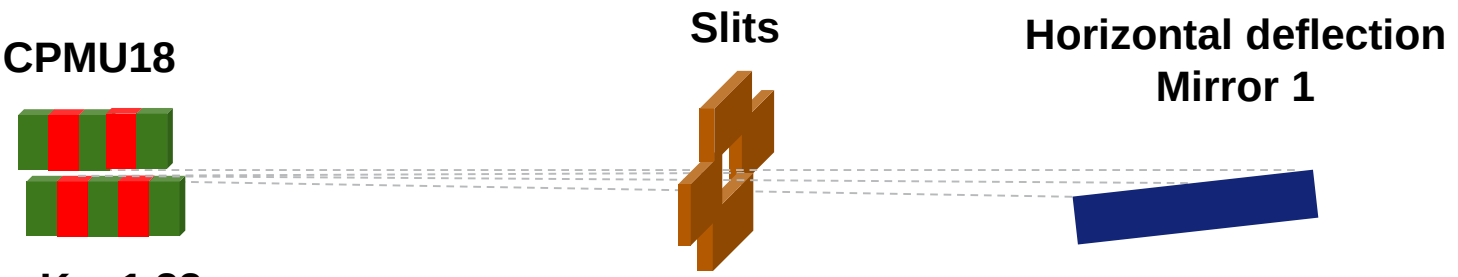
Configuration to simulate

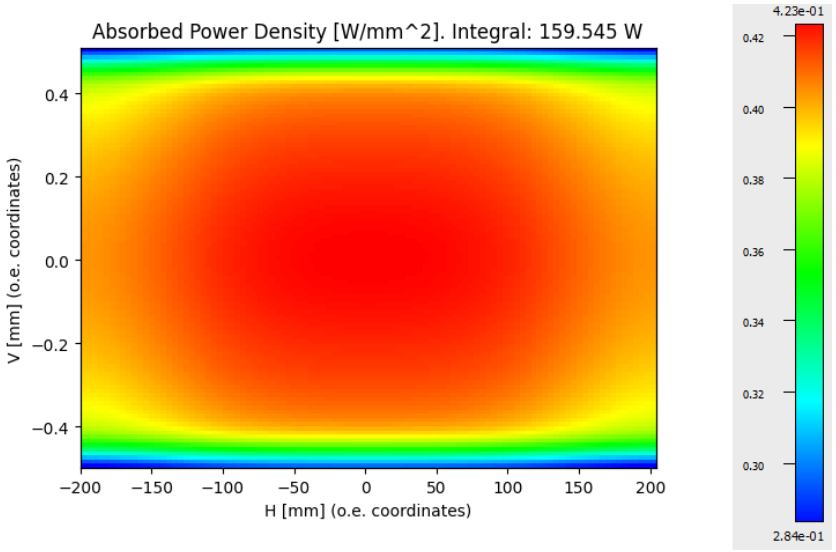
Up view:

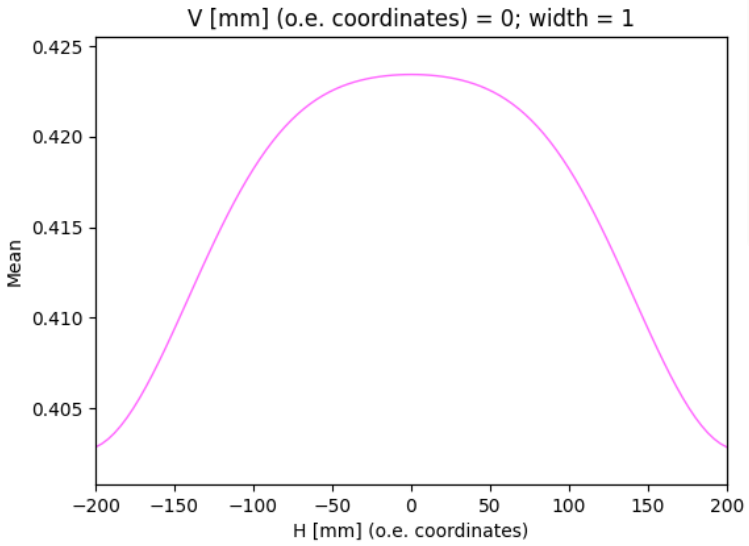


The point of using 0.59 mm of horizontal slit aperture is to spread the heat-load over the complete mirror length. For **SRW** and **SRCAL** algorithms, this configuration can be simulated by calculating the undulator emission through a slit at **30 m** with an horizontal aperture of **0.8 mm** (which covers the mirror length @ 2.0 mrad).

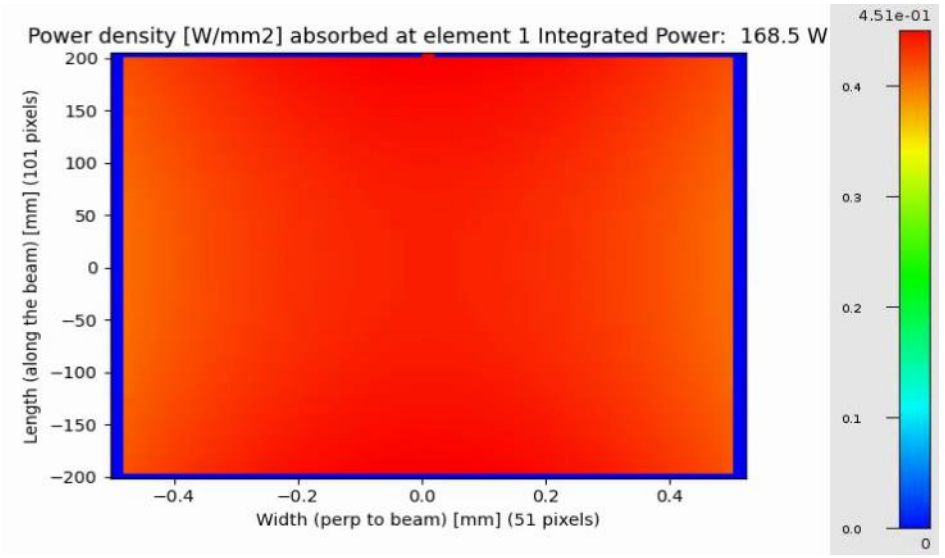
Total absorbed power density in mirror (H: 0.8 mm)

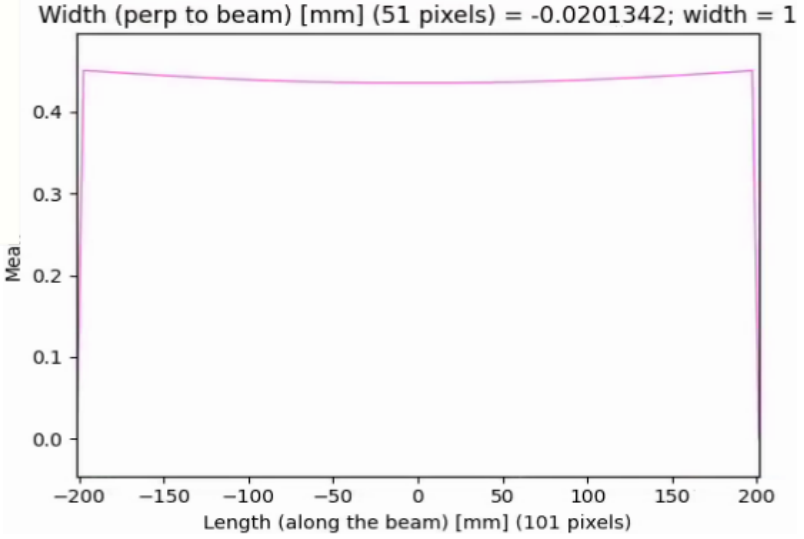
SRW





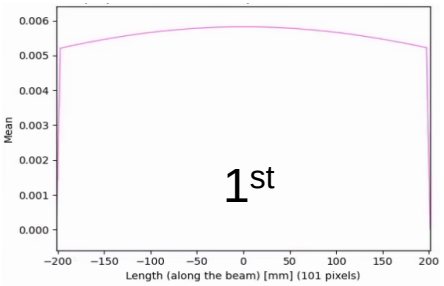
SRCALC*

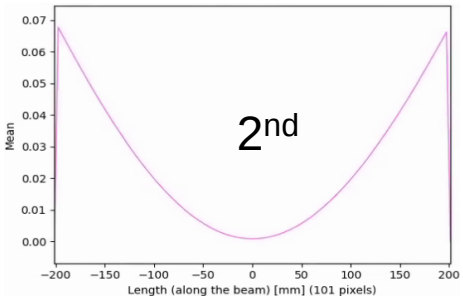


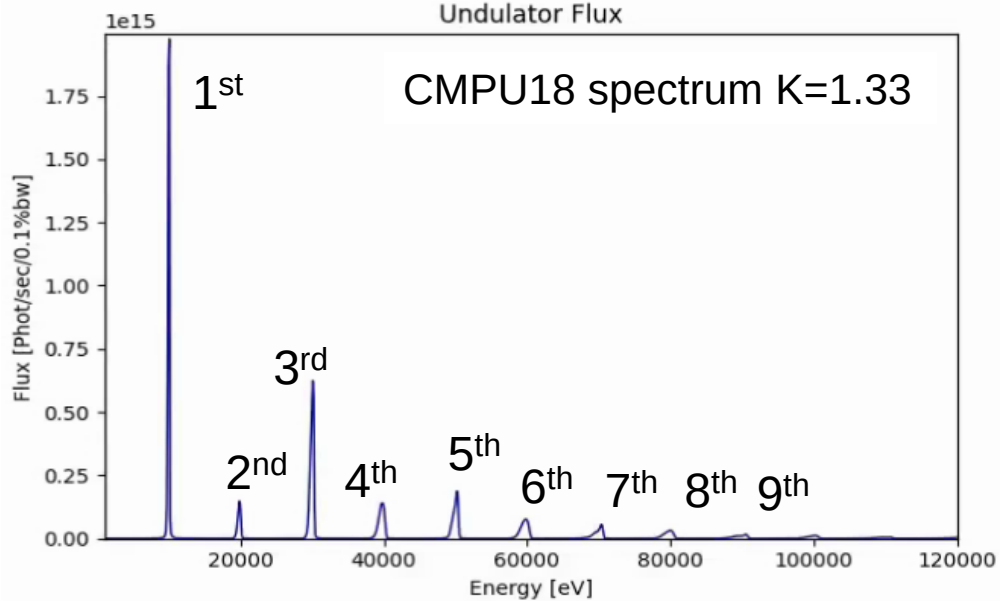


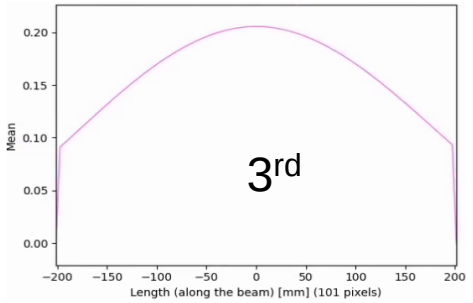
* Notice that in the SRCAL figure the mirror length is in the vertical axis

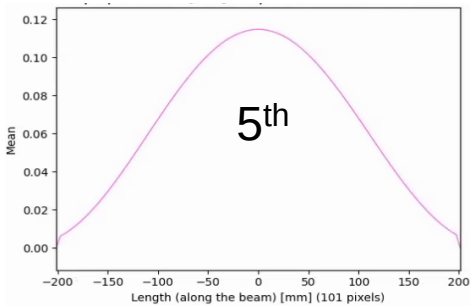
Exploring the absorbed power density in mirror:

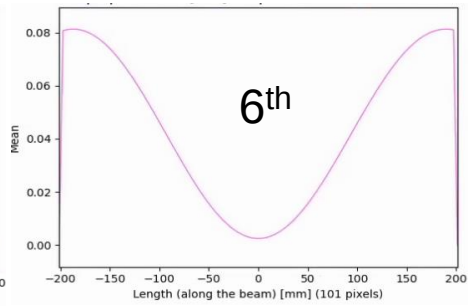


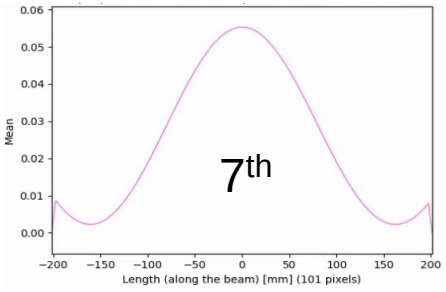


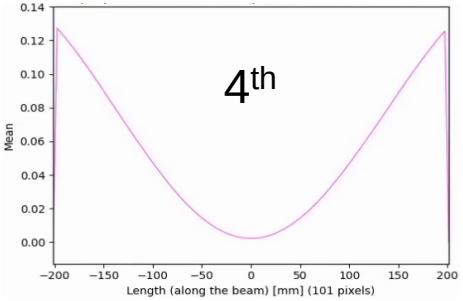












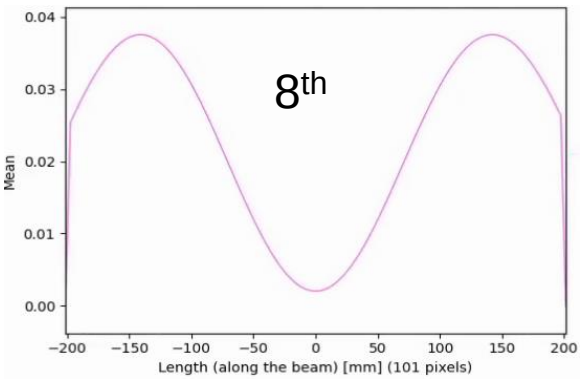
Seems like there is a trend:

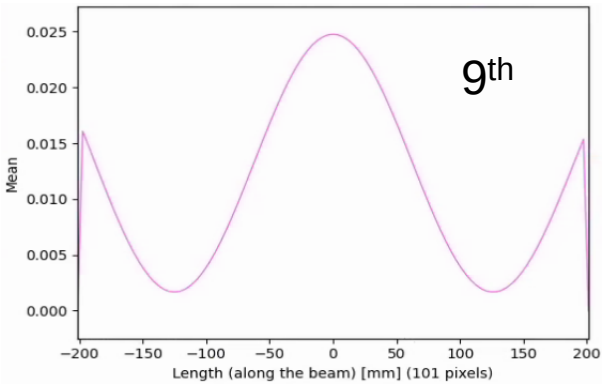
- Odd harmonics contribute to mirror center
- Even harmonics contribute to mirror edges

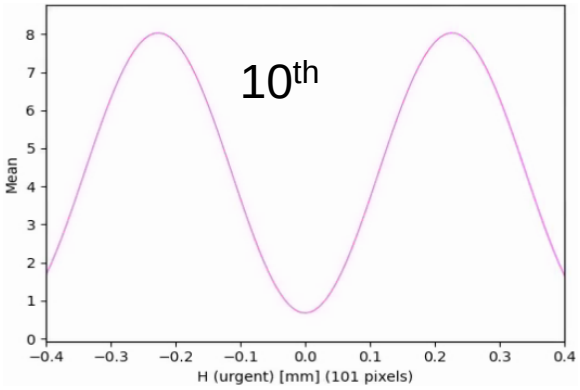
But that changes from 7th harmonic.

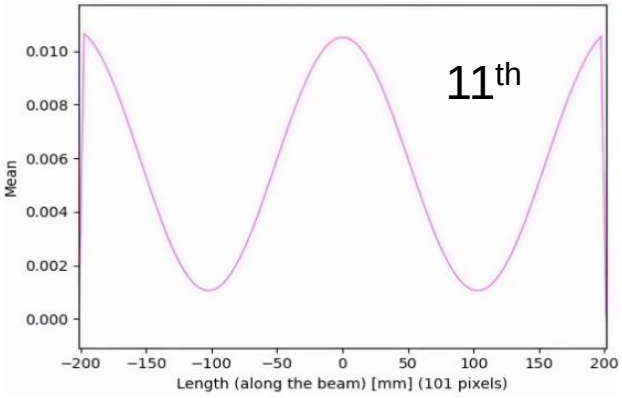
SRCALC

Exploring the absorbed power density mirror:







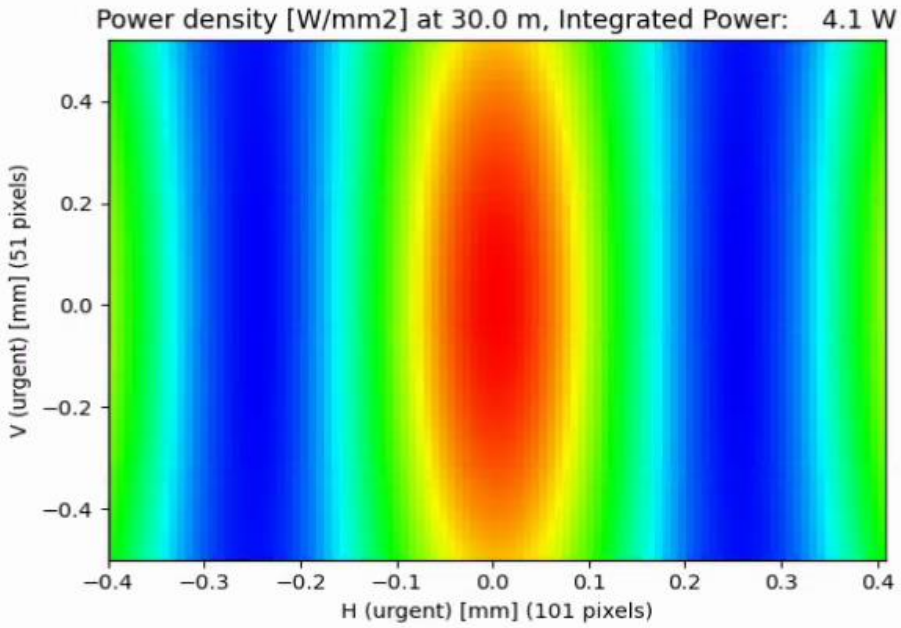


Power load of higher odd harmonics contributes to mirror center and edges.

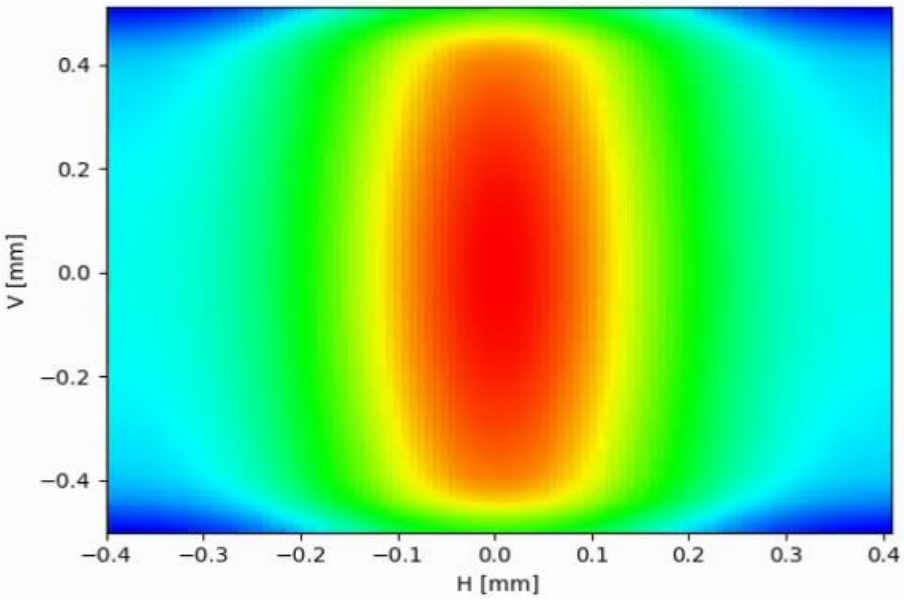
SRCALC

Power density distribution of 9th harmonic:

SRCALC - 9th harmonic



SRW - 9th harmonic



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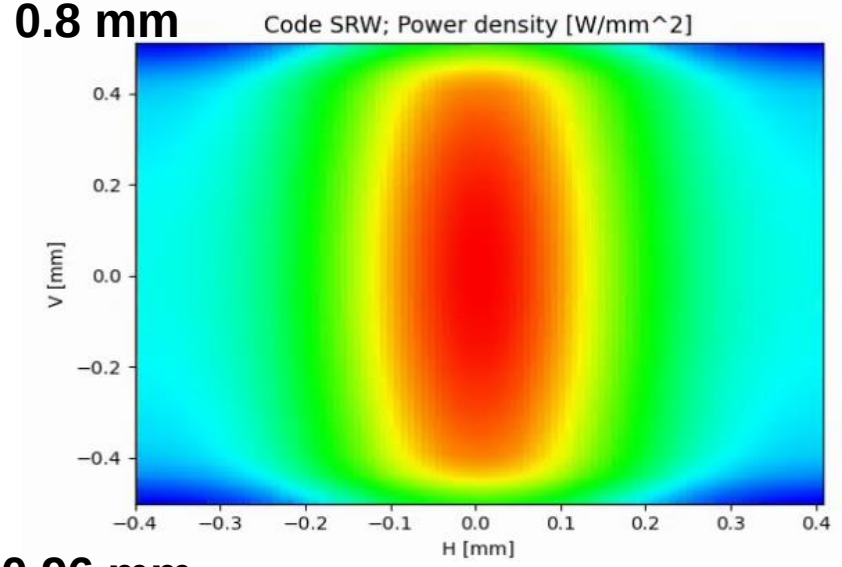
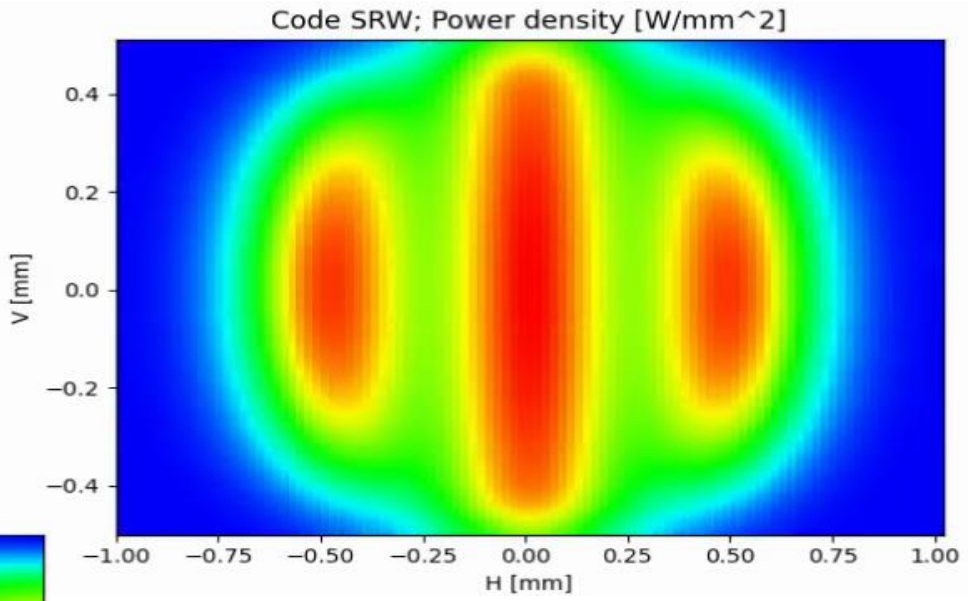
SRW 9th harmonic

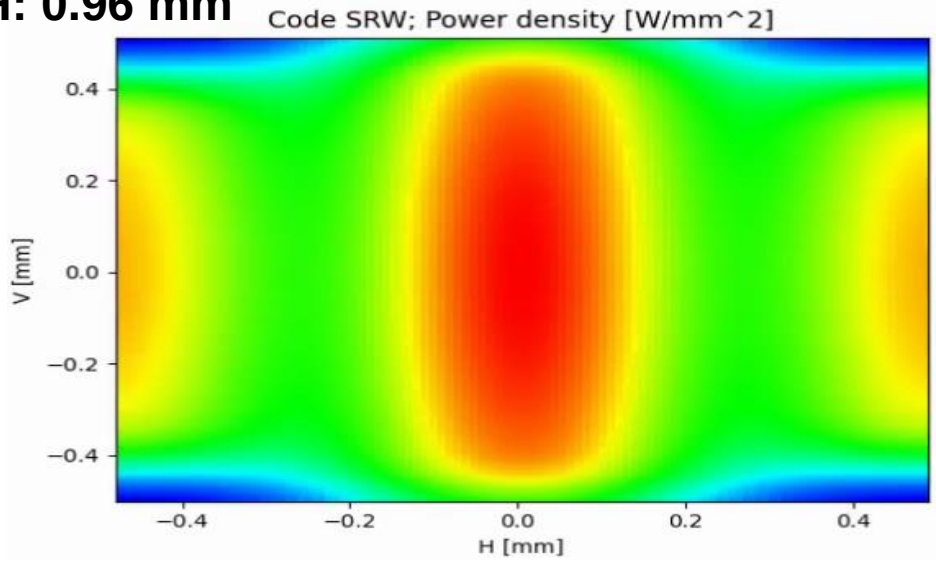
H: 0.8 mm



H: 2.0 mm



H: 0.96 mm

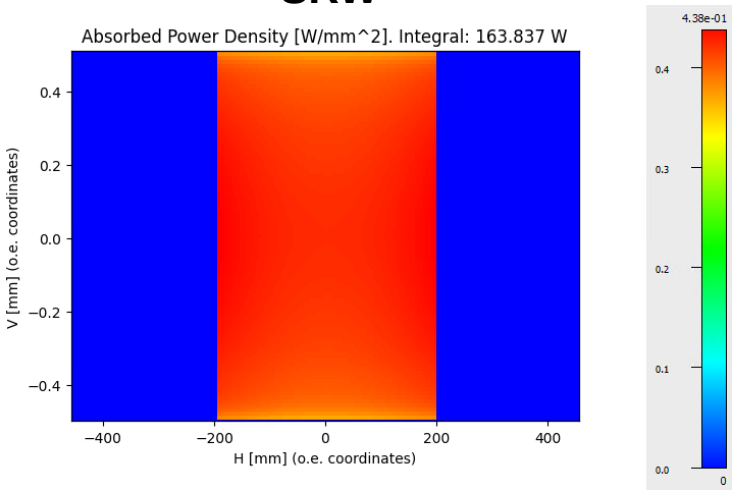


Power density distribution 9th harmonic

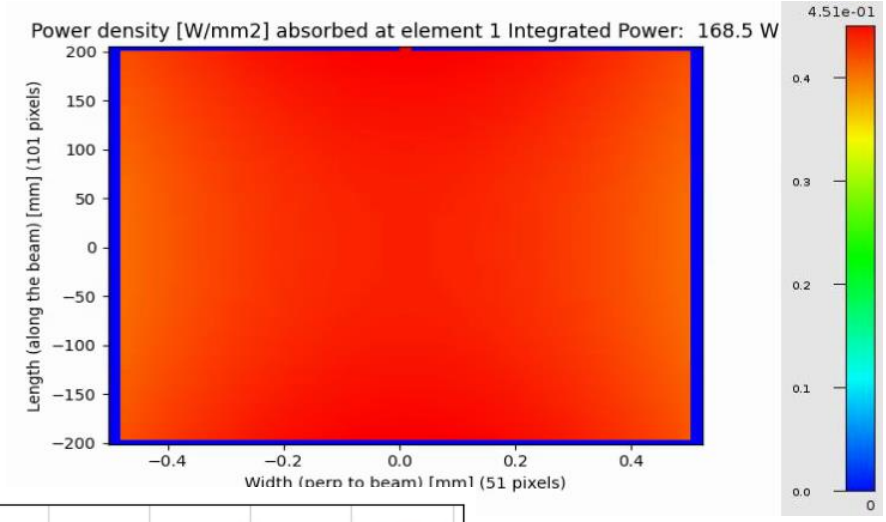
SRW code have some issues with calculations near to the edges. One solution is to use larger apertures.

SRW (correct window) and SRCAL

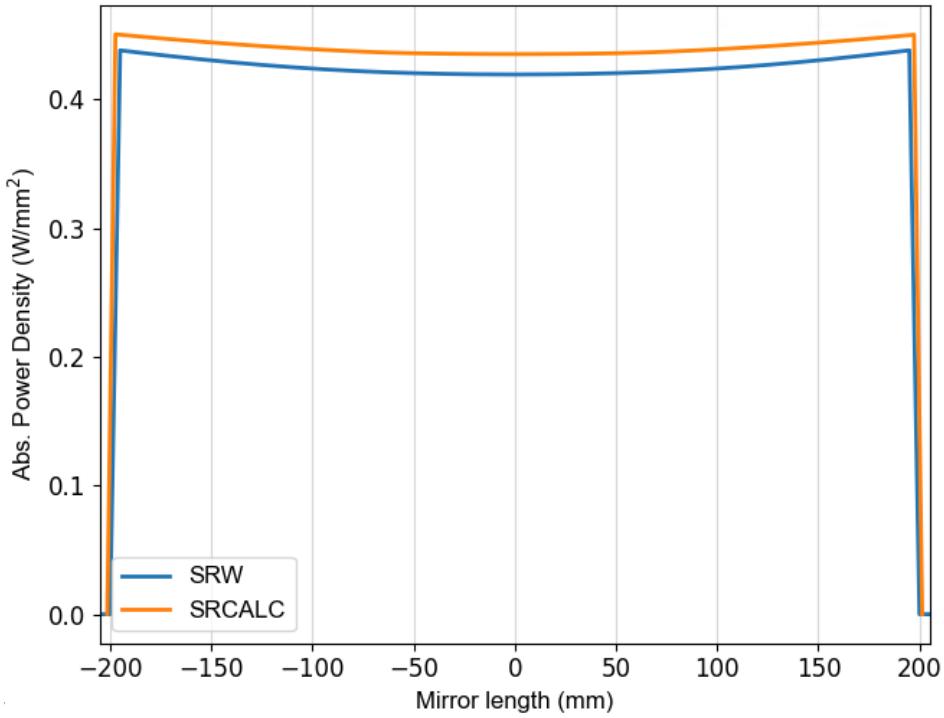
SRW



SRCALC



Total absorbed power in the mirror



Differences around the 4%