TCS Optimization week 3 Update

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Timeline Progress:

- Week 1: Setting-up a Finesse environment and getting up to speed in running Finesse code
- Week 2: Run a Full aLIGO Finesse simulation and extract information from the model
  - Parallely, set-up optimization routines with simple well-known examples

We are here →

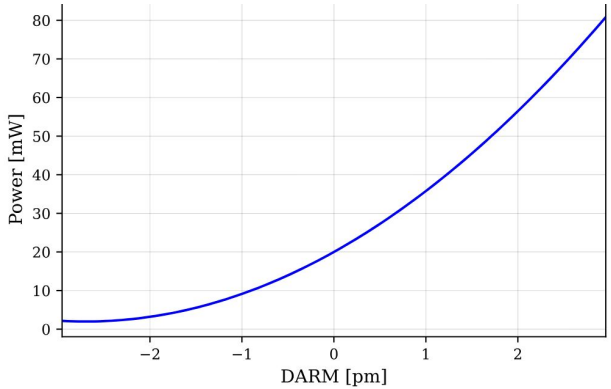
- Week 3: Add thermal components to the IFO Simulations

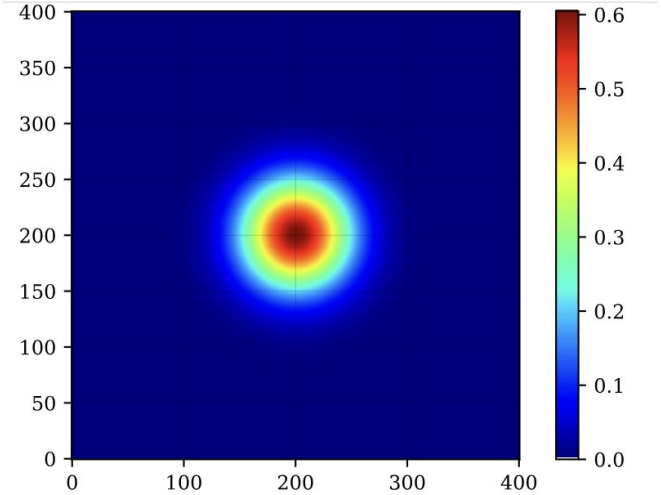
Next week:

- Week 4 & 5: start benchmarking the full-IFO models with optimization methods, PS and BO

Finesse(-Ligo)

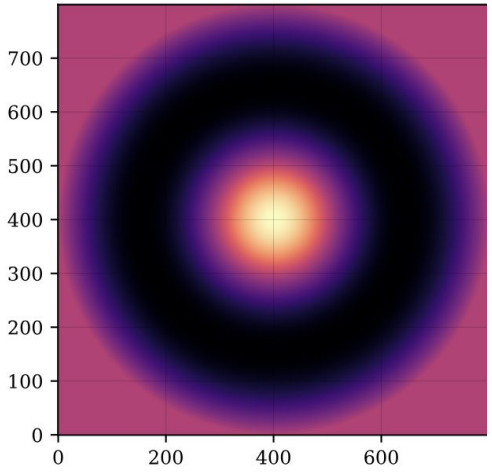
- Single cavity, coupled cavity and full aligo running in finesse
- Full aligo model from finesse-ligo locked and shows expected response
- Some issues still with finesse-ligo.factory but now have a working environment

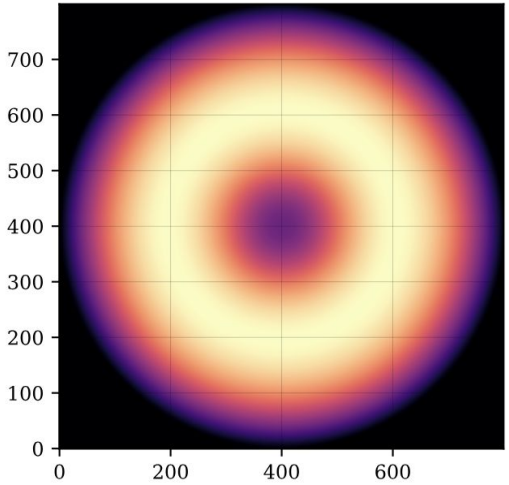




Thermal components:

- Had issues with dynamic surface and substrate maps in Finesse-Ligo, now resolved
- Can implement effects of ring heater and self heating to optimize ring heater power for simple single cavity case with Particle Swarm and Bayesian Optimization
- Next step is to expand optimization to coupled cavity and full aligo simulation from finesse-ligo





Optimization Packages:

- Current simple packages are functional as proof of concept
- Planning to switch particle-swarm to scikit-opt for future proofing
- Planning to switch Bayesian optimization to BAX for extended functionality as suggested in timeline
- Current code should be easily adapted

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