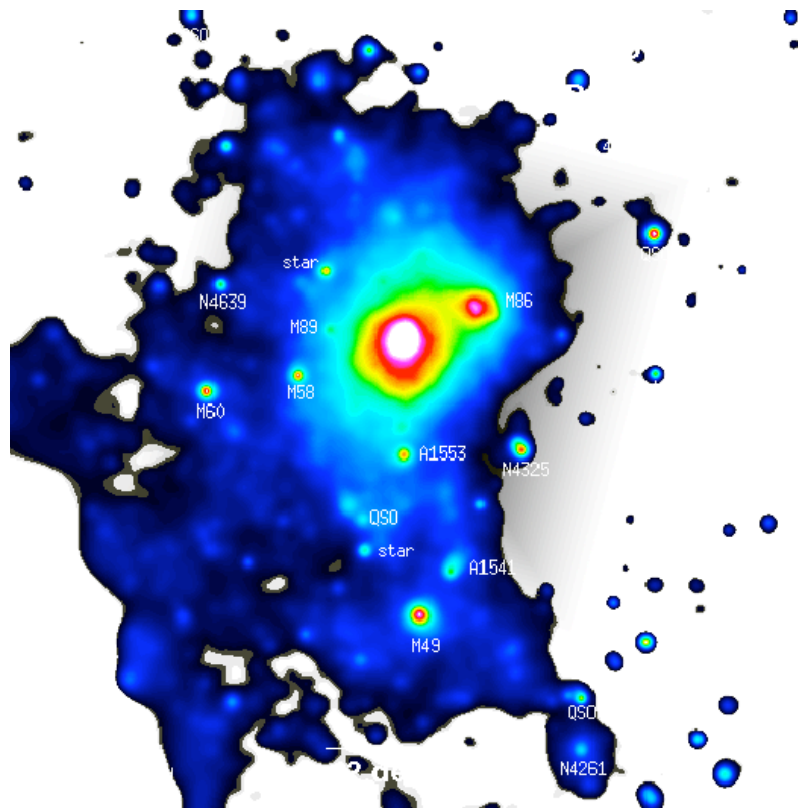


# Advanced Virgo

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## OSD WBS



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## Overview

- The current tasks listed in the OSD section of the Advanced Virgo WBS
- Discussion:
  - What is missing?
  - Is this structure compatible with the management
  - Who can do this work?
  - Special status for simulation development?



## OSD WBS (1/5)

### OSD

- OSD.1 Design of arm cavity geometry
  - OSD.1.1 investigate optical losses due to mirror surface imperfections (simulation)
  - OSD.1.2 investigate optical losses due to mirror surface imperfections (experiment)
- OSD.2 Update optical design
  - OSD.2.1 monitor design development in OSD and other SMs, update design when necessary
- OSD.3 effects of mirror, BS substrate geometry
- OSD.4 test compatibility of etalon effect and thermal compensation
- OSD.5 Investigate scattered light in CITF
  - OSD.5.1 Compute surface requirement/ suspension requirements for optical layouts of the central interferometer
- OSD.6 Define NDRC layout
  - OSD.6.1 define ROC and positions of mirrors
  - OSD.6.2 compute tolerances of mirror parameters



## OSD WBS (2/5)

### OSD.7 Modelling with 3D software

- OSD.7.1 select 3D simulation software
- OSD.7.2 create 3D simulation of optical layout
- OSD.7.3 create simplified mechanical model of vacuum enclosure and payloads
- OSD.7.4 analyse feasibility of wedges in input mirrors
- OSD.7.5 check compatibility of BS with reference mass design
- OSD.7.6 perform 3D simulations to verify 2D and/or create solution in 3D
- OSD.7.7 Detailed 3D model of CITF
- OSD.7.8 Detailed 3D model of CITF (merging of SIB)

### OSD.8 Modelling Advanced Virgo with DarkF

- OSD.8.1 Upgrade of DarkF for non-paraxial behaviour
  - OSD.8.1.1 Theoretical preparation (JYV)
  - OSD.8.1.2 Coding
- OSD.8.2 Analyse measured mirror maps
- OSD.8.3 Create model for full optical layout
- OSD.8.4 Upgrade DarkF for Signal Recycling



## OSD WBS (3/5)

### OSD.9 Modelling Advanced Virgo with Finesse

- OSD.9.1 setup basic Finesse input file for proposed baseline design and selected options
- OSD.9.2 investigate effects of astigmatism
- OSD.9.3 investigate effects of spatial thermal deformations
- OSD.9.4 compile loss budget for SRC and PRC
- OSD.9.5 Add radiation pressure force to finesse
  - OSD.9.5.1 setup source code server for virgo collaboration
  - OSD.9.5.2 rewrite matrix code to include frequency as degree of freedom
  - OSD.9.5.3 check consistency of utility functions with new matrix design
  - OSD.9.5.4 add new input interface for suspensions models
  - OSD.9.5.5 test code against optickle/siesta
  - OSD.9.5.6 simplify/enhance suspension models
  - OSD.9.5.7 document suspension model and new matrix model
  - OSD.9.5.8 create Finesse input file with full virgo model



## OSD WBS (4/5)

- Modelling Advanced Virgo with OptoCad

- OSD.10.1 preliminary 2D simulations to identify possible layouts
- OSD.10.2 compare different wedge designs with respect to secondary beams
- OSD.10.3 computation of the optics position
- OSD.10.4 create model for full optical layout



## OSD WBS (5/5)

### OSD.11 Coordination of simulation work (towards commissioning)

- OSD.11.1 adapting one time domain code (Siesta/E2E?)
  - OSD.11.2 adaptation of Optickle
  - OSD.11.3 create database of input files/ numerical models
  - OSD.11.4 maintenance of DarkF code
  - OSD.11.5 maintenance of FINESSE code
  - OSD.11.6 maintenance of Optickle code
  - OSD.11.7 maintenance of Siesta code
  - OSD.11.8 maintenance of OptoCAD code
  - OSD.11.9 maintenance of 3D software
  - OSD.11.10 documentation and maintenance of input files for all simulation codes
  - OSD.11.11 cross-checks between various simulation codes and input files
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## Discussion

- What is missing?
- Is this structure compatible with the management?
  - split OSD into several subsystems?
  - subsystem is not as monolithic as others, define monolithic task lists?
- Who can do this work?
  - new groups to take on simulation work?
  - tasks provide no extra funding or resources to groups, so might be not interesting
- Special status for simulation development?
  - the simulation development is in a much worse state than other subsystems. This is not reflected in the WBS and so far has been discussed but not acted upon. What to do?





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