

MIF Commissioning Schedule Estimate for bKAGRA Phase 1

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bKAGRA Phase 1 Conditions

- 3-km cryogenic power recycled Michelson
 - 2017.1 BS suspension complete
 - 2017.5 PR suspensions complete
 - 2017.5 Type-A for ETMs complete
 - 5 months of (PR)MI commissioning with dummy room temp. mirror
 - 2017.10 cryopayload install start
 - 2018.1 start cooling down
 - 1 week of PRMI commissioning with cryopayload before cooling down
 - PRMI should be there during cooling
 - 2018.3 start cryogenic test run
- Green could be ready at this point.

Lessons from iKAGRA

- Arm alignment takes ~ 1 week/one-way at most with PSL ~ 220 mW, without PRM ($T = 10\%$)
- Beam profiling takes ~ 1 day/position
- MICH lock to run takes ~ 3 weeks (including April commissioning period)
- What we didn't do in iKAGRA
 - beam collimating (iteration of PR2/3 position change and beam profiling at ITM/ETM)
 - multi-DOF lock (this time MICH and PRCL)
 - WFS, TRX/TRY, AS port
 - SR2, SR3 alignment
 - FSS using RefCav

bKAGRA Phase 1 Configuration

- 3-km power recycled Michelson
- With REFL/AS for LSC (feedback PRCL to IMC length?)

[W/m]	MICH	PRCL
REFL_I	+9.92e-01	-7.48e+07
REFL_Q	+6.61e+04	-3.52e+07
AS_I	+8.97e+02	-2.23e-01
AS_Q	-1.67e+06	+4.16e+02

- With REFL/AS WFS, TRX/TRY DC QPD for ASC
- Maybe with green (not necessary for phase 1)
- No requirement for sensitivity

300 K PRMI Schedule Estimate

- IMC to PR3 initial alignment: 1 week
 - PR3 to ETMX initial alignment (with PRM misaligned): 1 week
300 K dummy payload for ETMX should be ready at this point
 - ETMX to REFL initial alignment: 1 week
 - BS to ETMY initial alignment: 1 week
300 K dummy payload for ETMY should be ready at this point
 - ETMY to REFL initial alignment: 1 week
 - BS to AS initial alignment: 1 week
 - beam collimation with PR2/3: 2 weeks
 - PRM initial alignment: 1 week
 - REFL, AS, TRX, TRY optical table setup: 2 weeks (done in parallel)
- 2 months for initial alignment
- PRMI LSC: 2 weeks
 - PRMI ASC: 6 weeks
 - PRMI calibration, channel check, etc: 3 weeks
 - Test run with 300 K dummy payload: 1 week
- 3 months for commissioning and test run

CRYp PRMI Schedule Estimate

- ETMX and ETMY initial alignment: 0.5 week
- PRMI restoration: 0.5 week
→ start cooling down

1 week for
CRYp PRMI

Summary

- All of the PRMI commissioning except CRYp initial alignment has to be finished with 300 K dummy payload (2017.5-10)
- 5 months should be enough for us
- Items which should be ready by 2017.5
 - all the analog electronics
 - LSC/ASC RT model, including calibration
 - LSC/ASC modeling (e.g. Optickle)
 - cabling diagram