

Summary of the initial alignment closeout meeting

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Contents

1 Overview	1
2 Meeting materials	2
3 Good moves	3
4 Points for possible improvement	3
5 Notable incidents and events	4
6 Other remarks not shown in the materials	4
7 Conclusions	5
7.1 Conclusion	5
7.2 Action Items	5

1 Overview

A meeting entitled “Initial Alignment Closeout Meeting” was held on November 13th 2017 at the Toyama University. The meeting was focused on variety

of lessons that we learned over the course of the initial alignment activities taken place in this past October. The objectives of the meeting were:

- Sharing important lessons.
- Reduction of the duplicated effort.

This report summarizes relevant points that were raised and discussed during the meeting. This report does not attempt to mention all the details for conciseness. For those who are interested in the details, please refer to the meeting materials listed in the following section.

2 Meeting materials

1. Alignment process, [JGW-T1707403-v3](#)
2. Type-C, [JGW-G1707422-v1](#)
3. Type-Bp, [JGW-G1707405-v1](#)
4. Type-B, [JGW-G1707402-v0](#)
5. Digital system, [JGW-G1707404-v1](#)
6. Beam-chamber positions, [JGW-G1707418-v2](#)

3 Good moves

- ⊙ Emergency meeting for the unexpectedly tilted PRs 2 and 3.
- ⊙ Reduction of air current by sealing the chambers with pieces of aluminum foil.
- ⊙ The optical levers served as good references for recovering the alignment once calibrated.
- ⊙ Use of the pushers for aligning the Type-C suspensions.
- ⊙ The sign definition of the optical levers was defined and shared among the VIS and commissions groups.

4 Points for possible improvement

- ⊙ We should have calibrated the optical levers from the beginning. This resulted in unnecessarily repeated alignment processes.
- ⊙ We should have numerically evaluated the alignment precision everyday after the activities to predict what we would do next.
- ⊙ Not all the lessons learned during iKAGRA were transferred to the latest commissioning team.
- ⊙ The k1prm computer stopped working. This lead us decide to splitting the computer into two computers.

- ⊙ We should have been clear about the objective of the alignment activities – the team thought it was OK with the beam being horizontally off on PR3. Later this resulted in a delay due to the repeated alignment process.
- ⊙ Watchdog for the coil drivers of PR3 did not have a clear indicator.
- ⊙ The magnetized screws on the IMMTs 1 and 2 must be replaced with non-magnetized ones.

5 Notable incidents and events

- ⊙ Power outage following a typhoon.
- ⊙ PRs 2 and 3 slipped.
- ⊙ The watchdog of the PR3 coil driver had been tripped without anyone noticing.
- ⊙ Swap of the BS coil drivers.

6 Other remarks not shown in the materials

- ⊙ The traversers of Type-Bp give a lateral shift of 8.8 mm only. This is insufficient to compensate for the current offset of 20 mm.
- ⊙ Glue will be applied to between the SR mirrors and their wires at their very bottom in order to reduce the chance of slippage.

- ⊙ PRM will be released from the earth quake stops for obtaining the REFL beam.
- ⊙ PR3 spot position might be off with respect to the designed beam position in its lateral position.
- ⊙ The vertical spot spot behind the IXA seems consistent with 1/300 slope. Note that the IXA chamber is leveled by design and not tilted.

7 Conclusions

7.1 Conclusion

We managed to complete the initial alignment of the interferometer beam up to both end stations even though we faced to several unexpected issues during the process.

7.2 Action Items

- ⊙ Replacement of the magnetized screws on IMMTs (1 month job, post phase-1).
- ⊙ Development of an automated procedure to check that the suspensions are not touching the cage or earthquake stops (no one is assigned yet).
- ⊙ Handorver meeting for the alignment process (KI will host one shortly).
- ⊙ Announcement of the oplev sign definition through both a document and medm (Shoda, Nakano will do in a month).

- ⊙ Establishing a user-friendly way of checking the BIO (Miyakawa, long-term project).
- ⊙ Make a plan for unscheduled power outage – with options of a kick test and/or non-kicking test (no one is assigned yet).
- ⊙ BS oplev diagonalization (Kozu, Barton).
- ⊙ Evaluate the pitch range which seems to be 17 urad only (KI will consult with Mark).
- ⊙ Measurement of PR3 and BS spot positions (Uchiyama, Telada wii do in this December).
- ⊙ Make sure the beam deflection in the Y arm is consistent with design (KI will calculate in a week).