PEM meeting brief reports

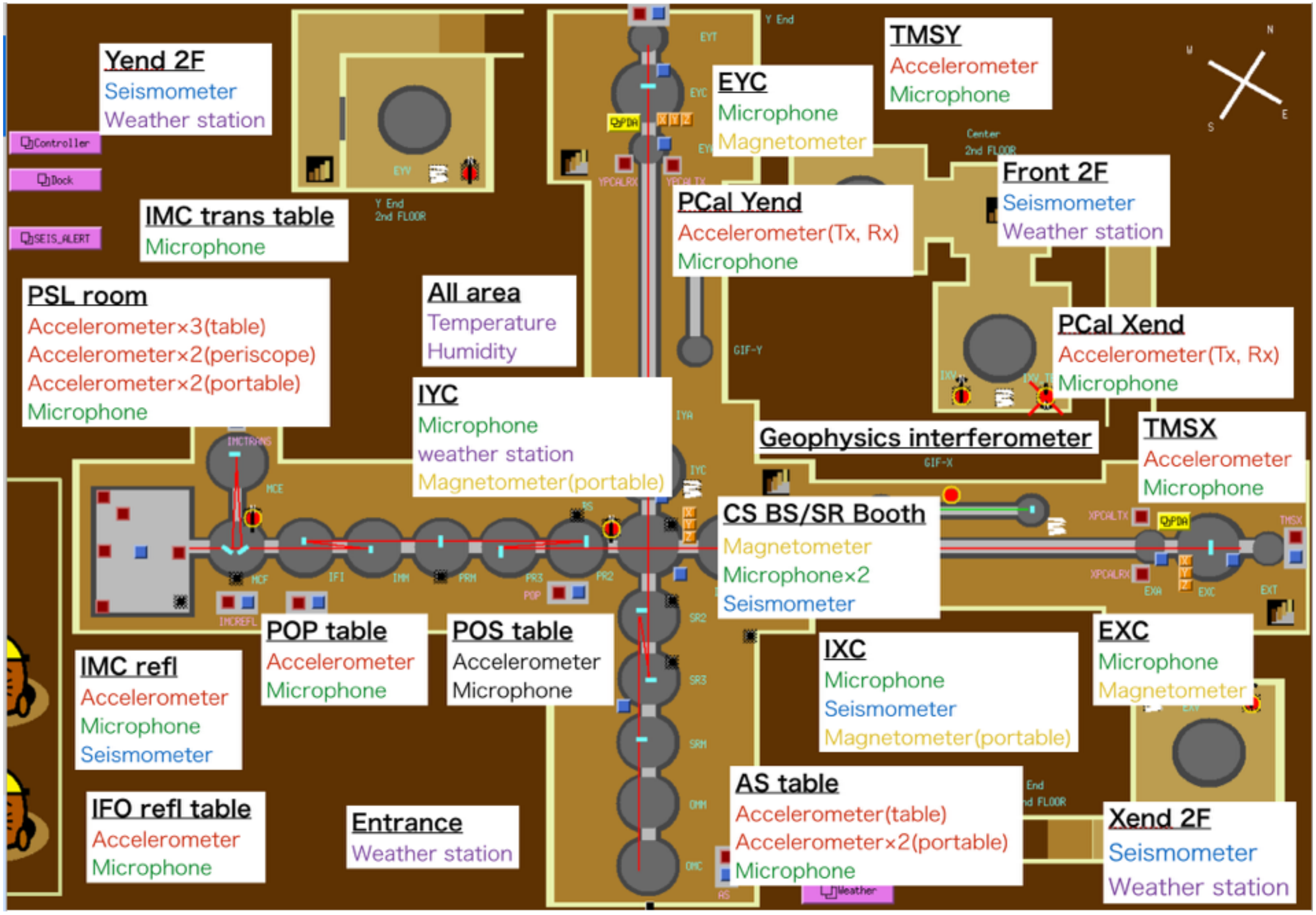
VK PEM meeting
2019/09/17 T.Yokozawa

Detector status

- We are in the commissioning phase toward the Dual Recycled Fabry-perot Michelson
- We tried to the SRFPMI, but there were large frequency and intensity main laser noise
- We also tried the PRFPMI now
- We decide the interferometer condition at end of this month (FPMI or PRFIMI or SRFPMI or DRFPMI)

- Active noise hunting will start from November

PEM status


Yend 2F
Seismometer
Weather station
IMC trans table
Microphone
PSL room
Accelerometer×3(table)
Accelerometer×2(periscope)
Accelerometer×2(portable)
Microphone
All area
Temperature
Humidity
IYC
Microphone
weather station
Magnetometer(portable)
EYC
Microphone
Magnetometer
TMSY
Accelerometer
Microphone
PCal Yend
Accelerometer(Tx, Rx)
Microphone
Front 2F
Seismometer
Weather station
PCal Xend
Accelerometer(Tx, Rx)
Microphone
Geophysics interferometer
TMSX
Accelerometer
Microphone
CS BS/SR Booth
Magnetometer
Microphone×2
Seismometer
IMC refl
Accelerometer
Microphone
Seismometer
POP table
Accelerometer
Microphone
POS table
Accelerometer
Microphone
IXC
Microphone
Seismometer
Magnetometer(portable)
EXC
Microphone
Magnetometer
IFO refl table
Accelerometer
Microphone
Entrance
Weather station
AS table
Accelerometer(table)
Accelerometer×2(portable)
Microphone
Xend 2F
Seismometer
Weather station

PEM status

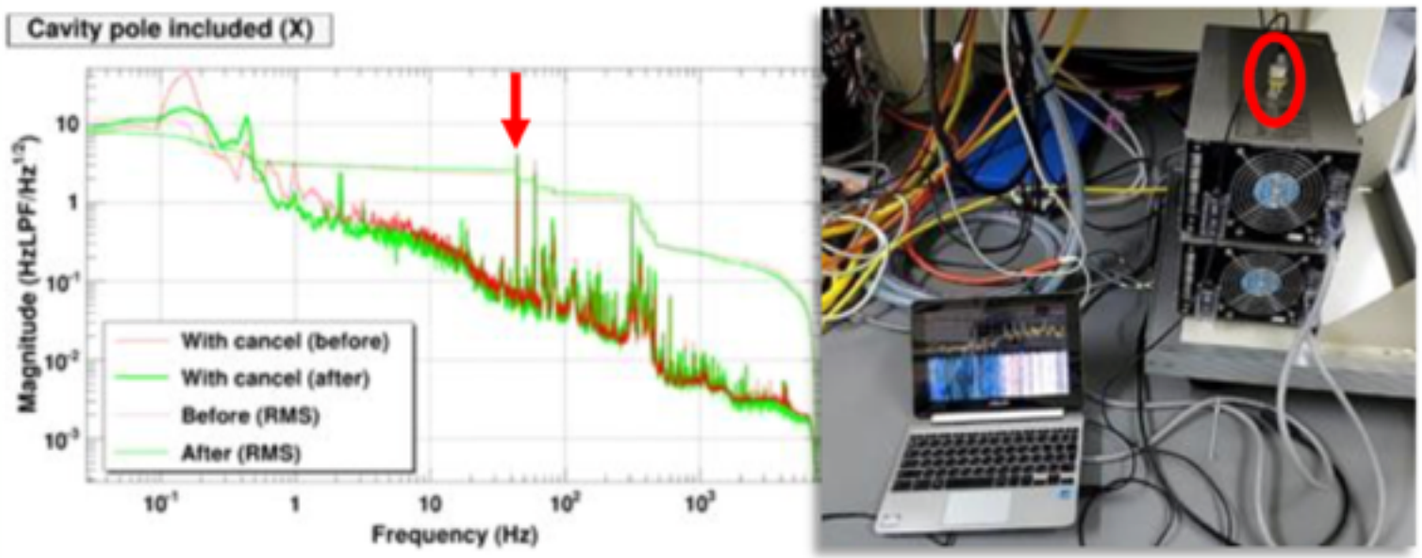
http://gwwiki.icrr.u-tokyo.ac.jp/JGWwiki/KAGRA/Subgroups/PEM

- Noise hunting with portable PEM project
  - portable PEM https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=10447
  - Noise hunting http://gwwiki.icrr.u-tokyo.ac.jp/JGWwiki/KAGRA/Subgroups/PEM/Meeting/190820/Agenda?action=AttachFile&do=view&target=PEM190820_yokozawa.pdf
  - Tried to turn on and off to some instruments (Vacuum pump, Cleaning funs,)
  - Bruco analysis
- Lightning study(Washimi)
  - See in next page
- Preparing the PEM injection
  - Main topics in next Virgo-KAGRA meeting
- Lock loss analysis using PEMs and earthquake
- KAGRA Line database(very basic version)
  - See in next page

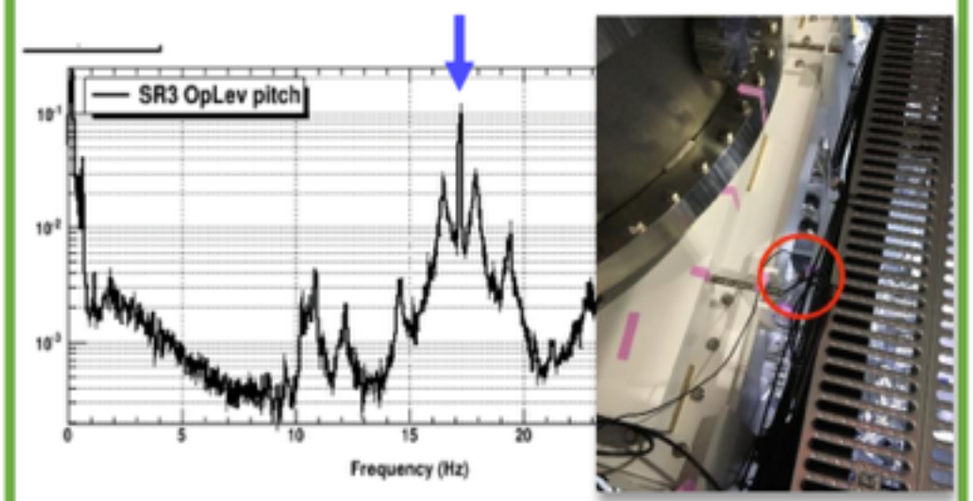
- Today topic
  - Virgo status and October commissioning(Federico or Irene) and KAGRA visitor tasks

- Hunted noises by portable PEMs!

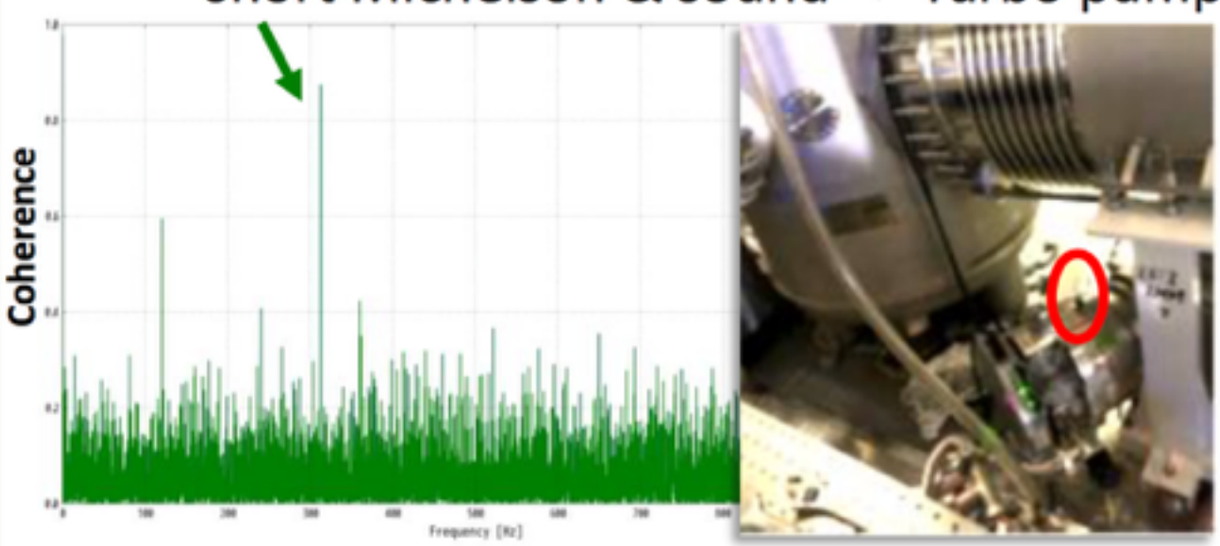
44Hz line in ALS => Vibration of 24V DC in PSL room



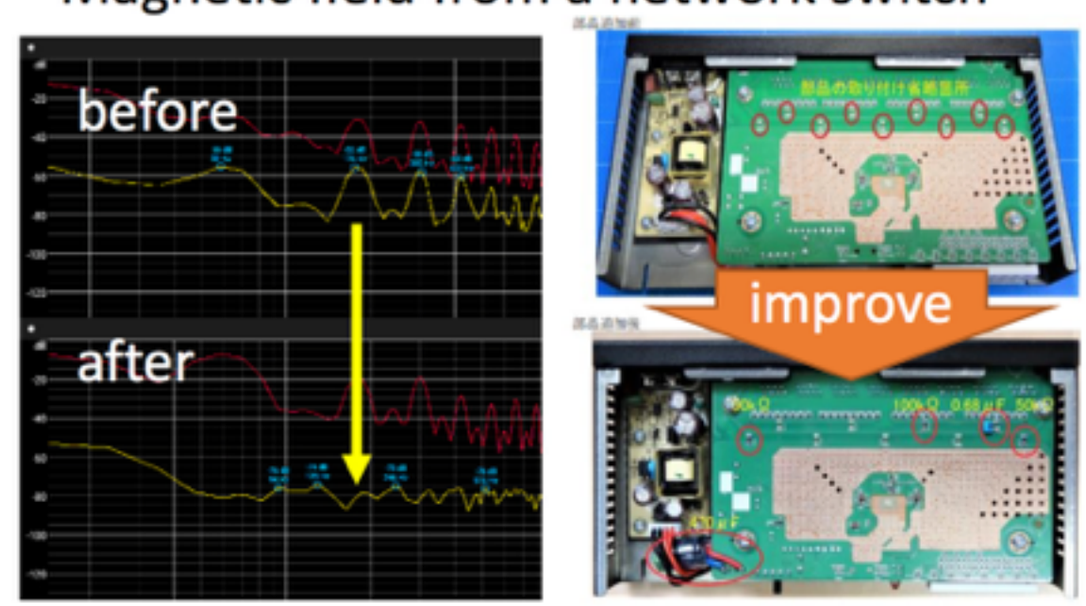
17Hz line in Signal Recycling Cavity
=> Fan Filter and cables



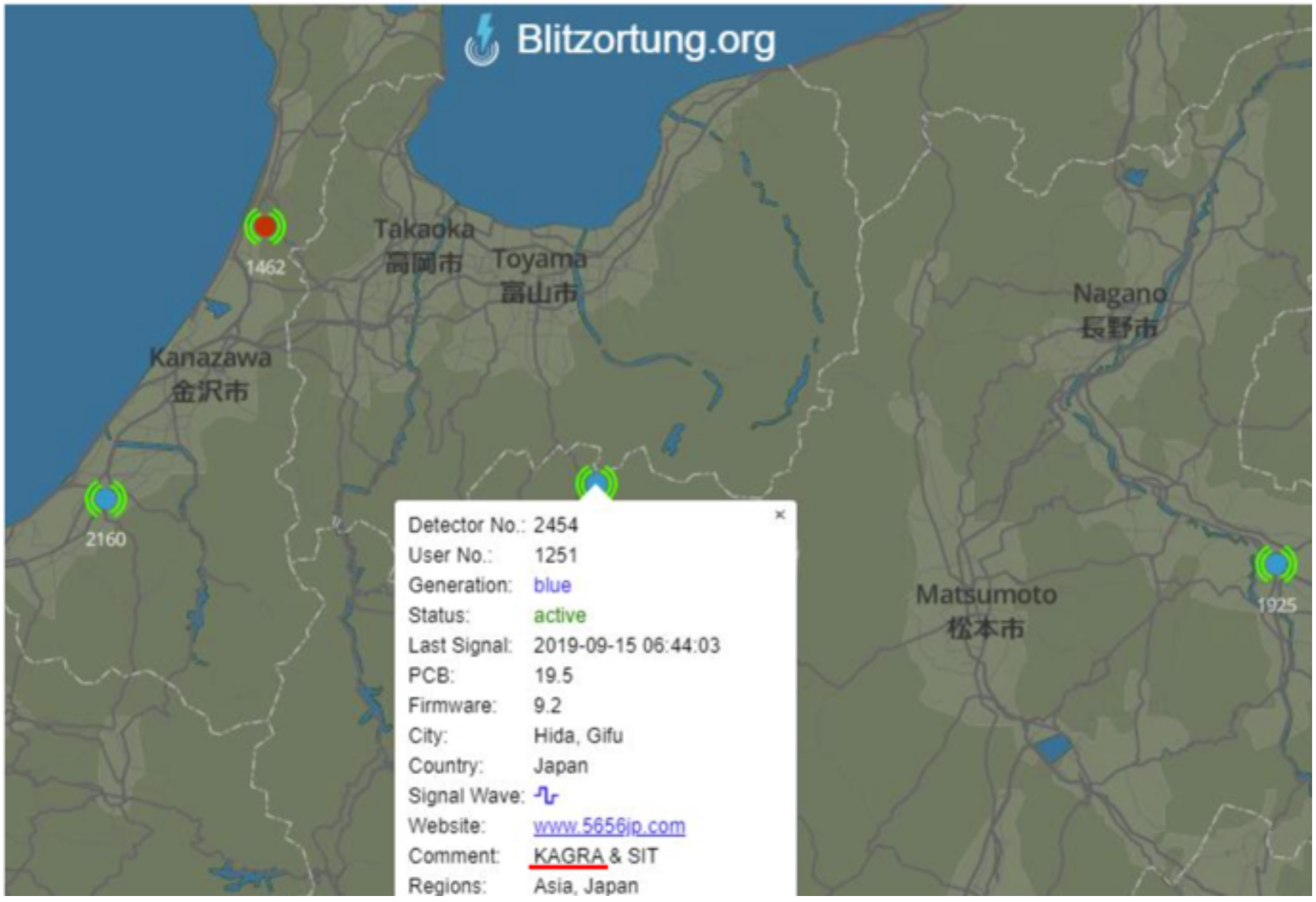
312.5Hz Coherence between
short Michelson & sound => Turbo pump



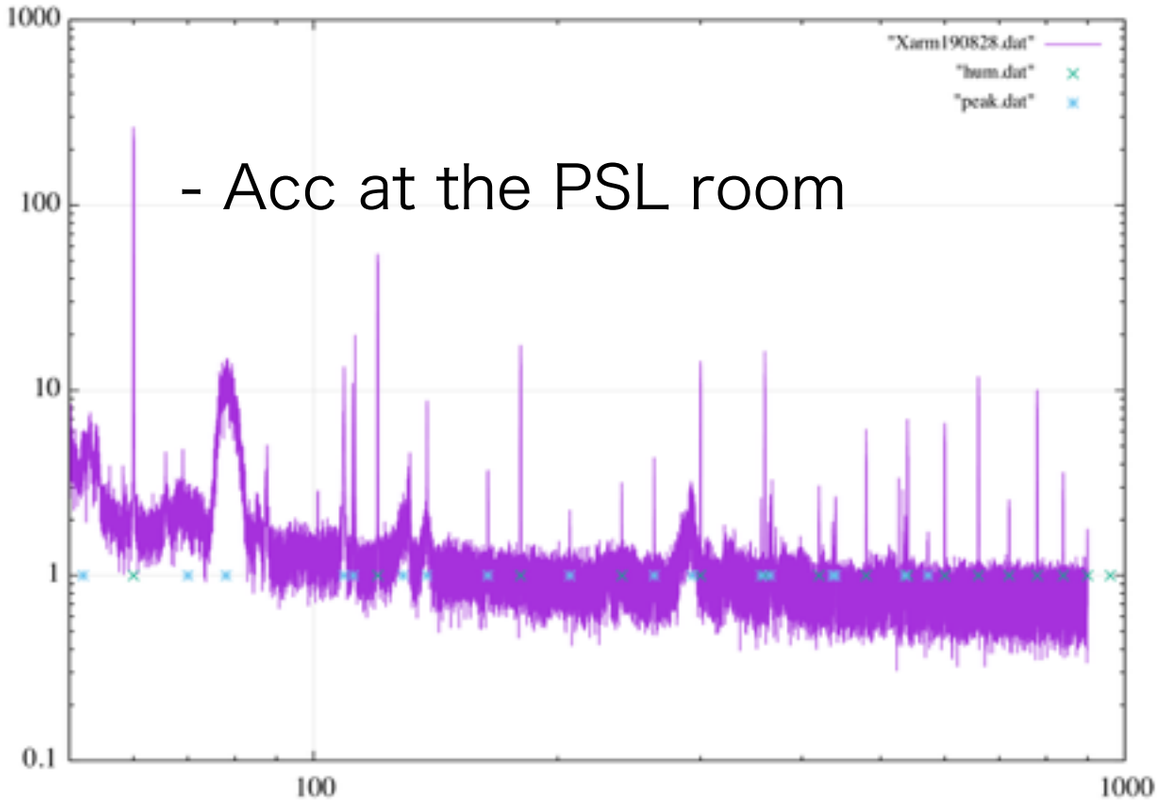
Magnetic field from a network switch

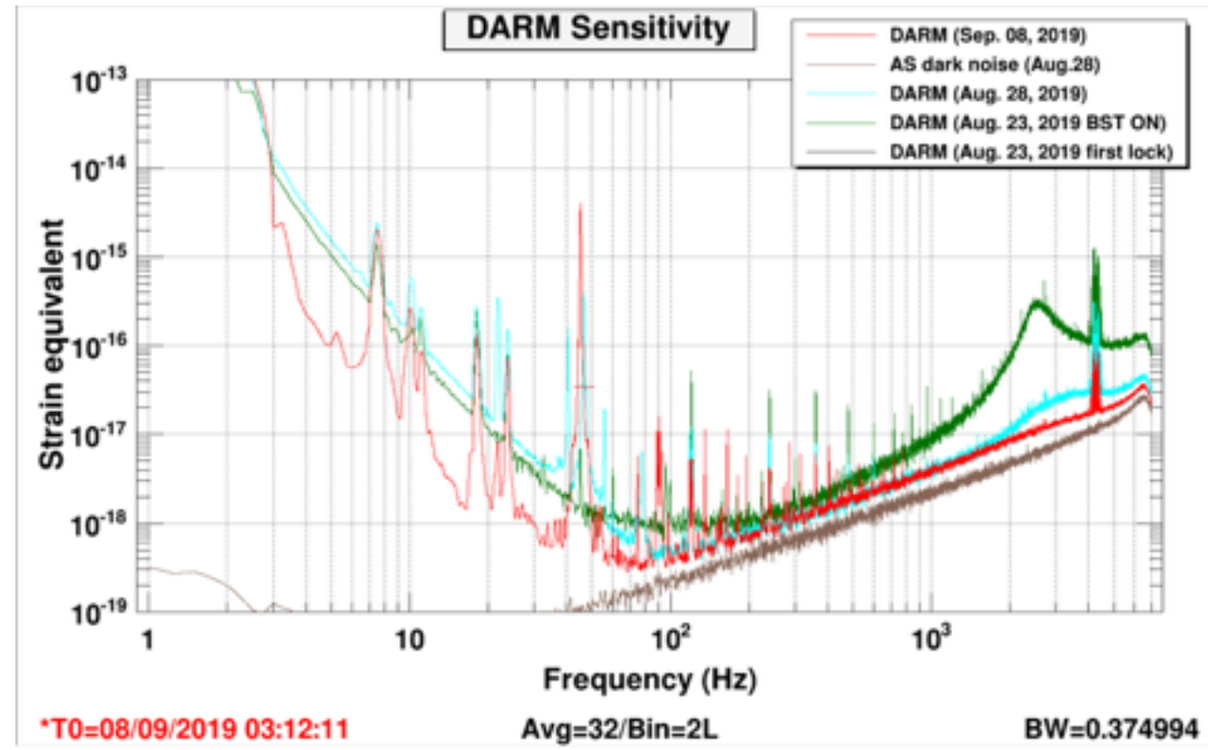


- Lightning monitor report
  - Please ask Washimi-san directory.



- Web-based KAGRA line database
  - We can start the investigation using the interferometer signals





PEM (Center)

takaaki.yokozawa - 01:43, Saturday 07 September 2019 (10391)

Festival of the PSL vibration investigation vol.2

I entered the PSL room and checked the vibration of each instruments with portable chromebook accelerometer.
Tonight I will post the investigation of the PSL vibration with permanent PEMs and frequency noise obtaioned by Y arm cavity lock 27th Aug.

Fig.1 Acclerometer signals placed on the PSL optical table and microphone (50-60Hz).

I couldn't find clear peaks from the each PEMs, but there is large coherence with 27th run around the 52Hz,
especially with the accelerometers on the PSL optical table (Fig.2).
I found one candidate of the 52Hz vibration from the TTFSS circuit. Fig.1 shows the spectrogram of the acc with placing on the TTFSS circuit.
Thereare also small peaks around 56Hz from TTFSS circuit.

There are large peaks around 58.5 at both ACC and MIC (Not strong coherence from the Yarm cavity).

Finally, I will pick up the interesting peaks
54.5 ACC with microphone
56.2, 56.4 and 57Hz small ACC peak
58.2Hz only ACCs
58.34Hz narrow peaks at ACC
58.5Hz ACC with large microphone, no sigarl at the ACC1 (hint of the noise source come from the refcav area)

Images attached to this report

PEM (Center)

takaaki.yokozawa - 01:13, Saturday 07 September 2019 (10390)

Festival of the PSL vibration investigation vol.1

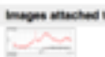
I entered the PSL room and checked the vibration of each instruments with portable chromebook accelerometer.
Tonight I will post the investigation of the PSL vibration with permanent PEMs and frequency noise obtaioned by Y arm cavity lock 27th Aug.

Fig.1 Acclerometer signals placed on the PSL optical table and microphone (40-50Hz).
ACC1 around refcav, ACC2 around the PMC, ACC3 around the elec. rack
There are three peaks(41.2, 23.9, 46.2Hz).
We can infer that 41.2Hz come from the ACC2,3 area and no strong coherence with laser frequency noise evaluated
by the Y arm cavity silent run(27th. Aug.).

Some vibration at 43.8.
We found large vibration from the DC power supply, but this frequency was between 44-45Hz, so another vibration source was exist,
or resonant frequency of the PSL optical table? We can check with the impact hummer or vibration injector.
Also, there is large coherence with laser frequency noise and microphone, we must search the origin of it when we enter the PSL room next time.

Small vibration at 46.2Hz, inferred from the ACC1,2 but I couldn't find the source by portable ACC by chromebook.
We need the kistler ACC with long time integration.

Images attached to this report



PEM (Center)

takaaki.yokozawa - 03:15, Saturday 07 September 2019 (10393)

Festival of the PSL vibration investigation vol.4

I entered the PSL room and checked the vibration of each instruments with portable chromebook accelerometer.
Tonight I will post the investigation of the PSL vibration with permanent PEMs and frequency noise obtaioned by Y arm cavity lock 27th Aug.

Fig.1 Acclerometer signals placed on the PSL optical table and microphone and accelerometers placed on the main lase amp (100-150Hz).

There is some peaks and coherence at the 101Hz, but still unknown origin.
No sound vibration, no vibration from main laser white racks.
This is not certain, amplitude of the ACC1 slightly higher than ACC2 and ACC3, so origin is close to the refcav area.

There is 109Hz peak detected both PSL ACC and microphone.
Also, there is some coherence with channels outside of the PSL room(BS magnetometer, suspension, IYC microphone, ...)
I thing this origin is out of the PSL room and strongly affected to the frequency noise.
This identification is one of the highest task of PEM team!

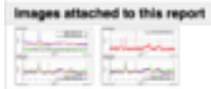
112, 112.5Hz, 113HzHz noise. This may come from the electronics of the main laser amp. We can detect large signal both from the ACC and MIC at PSL room
and ACC on the main laser amp.
We want to investigate with Nakano-san or IOO/LAS guys to move the white main lack or path to the vibration to the frequency noise.
We can reject the possible path from the rod for the green fiber, because portable 2 accelerometer was placed at the rod.
There is no (or very very small) ine at the prtable 2 accelerometer.

138Hz noise, maybe around refcav area, and no acoustic vibration, some large coherence with frequency noise.
This line varied with time, and I suspect origin come from around the refcav area.

There are small peaks at 117, 130.5 and 145Hz, but I may remin jsut a memo.

large peak around the 131Hz and small peak around the 145Hz were disappeared after turned off the 24V power supply by Washimi-san and Nakano-san

Images attached to this report



PEM (Center)

takaaki.yokozawa - 02:16, Saturday 07 September 2019 (10392)

Festival of the PSL vibration investigation vol.3

I entered the PSL room and checked the vibration of each instruments with portable chromebook accelerometer.
Tonight I will post the investigation of the PSL vibration with permanent PEMs and frequency noise obtaioned by Y arm cavity lock 27th Aug.

Fig.1 Acclerometer signals placed on the PSL optical table and microphone (60-100Hz).

65.3Hz(varied with time) and 68.5Hz(varied with time) come from the laser lack vibration and those line noise
also observed ath the Yarm cavity lock signal.
I suspect the dependence of the vibration origin (white laser lack vibration or laser amp vibration or something).

- Web-based KAGRA line database

https://www.icrr.u-tokyo.ac.jp/~yokozawa/KAGRA_line_database/index.html

Please fill the information for the KAGRA line database.

1. Fill your name
   Your Name
2. Fill the line frequency [Hz]
   ex) 44.2
3. Fill the line width[Hz]
   ex) 0.1
4. Fill the line source
   ex) 24V power supply
5. Fill the line source location
   ex) PSL room
6. Fill the device to find the line
   ex) Portable ACC
7. Fill the stationarity(amplitude, frequency, width)
   ex) Variate the amplitude
8. Fill the klog ID
   ex) 9942
9. Notes/comments

Submit

You can see the result in KAGRA Line database.

KAGRA Line DataBase v.1.0 2019/09/15 by T.Yokozawa

KAGRA line database v1

ファイル 編集 表示 挿入 表示形式 データ ツール アドオン ヘルプ

100% 閲覧のみ

Date

	A	B	C	D	E	F	G	H	I	J	K
2	2019/09/16 4:42:07	PSL room	variable amplitude	9942	This line was already remov	24V power supply	Takaaki Yokozawa	44.2	0.1	Portable ACC	
3	2019/09/16 4:42:39	PSL room	variable amplitude	9942	This line was already remov	24V power supply	Takaaki Yokozawa	45.7	0.1	Portable ACC	
4	2019/09/16 4:46:46	IMMT1-PRM	Stationary	10109	Large vibration from the gas Only this vacuum pump outp Not only vibration but sound	Vacuum pump	Takaaki Yokozawa	312.5	0.1	Portable ACC, MIC	
5	2019/09/16 4:47:51	All area	Stationary	10109	Rotating frequency of the vc	Vacuum pump	Takaaki Yokozawa	460	0.1	Portable ACC	
6	2019/09/16 4:50:01	SRM	unknown	10109	Unknown coherence with SI	unknown	Takaaki Yokozawa	7.5	0.05	Bruco	
7	2019/09/16 4:50:34	SRM	unknown	10109	Unknown coherence with SI	unknown	Takaaki Yokozawa	9.81	0.05	Bruco	
8	2019/09/16 4:50:46	SRM	unknown	10109	Unknown coherence with SI	unknown	Takaaki Yokozawa	10.19	0.05	Bruco	
9	2019/09/16 4:51:26	OMC, OMMT	unknown	10109	Unknown coherence with O	unknown	Takaaki Yokozawa	374.2	0.05	Bruco	
10	2019/09/16 4:52:06	PSL	unknown	10109	Coherent with PSL ACCs bu	unknown	Takaaki Yokozawa	43.6	0.05	Bruco	
11	2019/09/16 4:52:18	PSL	unknown	10109	Coherent with PSL ACCs bu	unknown	Takaaki Yokozawa	111.9	0.05	Bruco	
12	2019/09/16 4:52:29	PSL	unknown	10109	Coherent with PSL ACCs bu	unknown	Takaaki Yokozawa	112.6	0.05	Bruco	
13	2019/09/16 4:52:49	PSL	unknown	10109	Coherent with PSL ACCs bu	unknown	Takaaki Yokozawa	223.75	0.05	Bruco	
14	2019/09/16 4:56:57	SRs	unknown	10210	SR suspension mechanical	SR mechanical	Takaaki Yokozawa	5	0.05	model prediction	
15	2019/09/16 4:57:04	SRs	unknown	10210	SR suspension mechanical	SR mechanical	Takaaki Yokozawa	11	0.05	model prediction	
16	2019/09/16 4:57:12	SRs	unknown	10210	SR suspension mechanical	SR mechanical	Takaaki Yokozawa	16	0.05	model prediction	
17	2019/09/16 4:57:19	SRs	unknown	10210	SR suspension mechanical	SR mechanical	Takaaki Yokozawa	50	0.05	model prediction	
18	2019/09/16 5:00:32	FFU	Stationary	10209	Coherence between SRCL a	SR3	Takaaki Yokozawa	17.2	0.05	ACCs, oplev	
19	2019/09/16 5:01:13	unknown	Stationary	10209	Coherence between SRCL a	SR3	Takaaki Yokozawa	29.75	0.05	ACCs, oplev	
20	2019/09/16 5:01:35	unknown	Stationary	10209	Coherence between SRCL a	SR3	Takaaki Yokozawa	35.5	0.05	ACCs, oplev	
21	2019/09/16 5:02:50	whole area	Stationary	10231	Vibration by gauge pumps (	Vacuum pump	Takaaki Yokozawa	450	0.05	Portable ACC	
22	2019/09/16 5:03:55	whole area	Stationary	10231	Reduced by turned off the v	Vacuum pump	Takaaki Yokozawa	465	0.05	Portable ACC	
23	2019/09/16 5:04:38	PSL room	Stationary	10231	ACC PSL room. Disappear	Vacuum pump	Takaaki Yokozawa	115.5	0.05	Portable ACC	
24	2019/09/16 5:04:44	PSL room	Stationary	10231	ACC PSL room. Disappear	Vacuum pump	Takaaki Yokozawa	141	0.05	Portable ACC	
25	2019/09/16 5:04:50	PSL room	Stationary	10231	ACC PSL room. Disappear	Vacuum pump	Takaaki Yokozawa	165	0.05	Portable ACC	
26	2019/09/16 5:07:53	unknown	--	10234	detected by BSm SRs oplev	BS SRs	Takaaki Yokozawa	10.9	??	Bruco	
27	2019/09/16 6:43:39	unknown	--	10235	Coherence with CS magnet	BS IP ACC	Takaaki Yokozawa	14	??	Bruco	
28	2019/09/16 6:43:55	unknown	--	10235	Coherence with CS magnet	BS IP ACC	Takaaki Yokozawa	22.5	??	Bruco	
29	2019/09/16 6:44:04	unknown	--	10235	Coherence with CS magnet	BS IP ACC	Takaaki Yokozawa	29.7	??	Bruco	
30	2019/09/16 6:44:37	unknown	--	10235	Coherence with CS magnet	BS IP ACC	Takaaki Yokozawa	42.25	??	Bruco	
31	2019/09/16 6:44:55	unknown	--	10235	Coherence with CS magnet	BS IP ACC	Takaaki Yokozawa	58.3	??	Bruco	
32	2019/09/16 6:45:24	unknown	--	10235	Coherence with CS magnet	BS IP ACC	Takaaki Yokozawa	93	??	Bruco	
33	2019/09/16 6:45:56	unknown	--	10235	Coherence with CS magnet	BS oplev	Takaaki Yokozawa	104	??	Bruco	
34	2019/09/16 6:46:08	unknown	--	10235	Coherence with CS magnet	BS oplev	Takaaki Yokozawa	107	??	Bruco	
35	2019/09/16 6:46:24	unknown	--	10235	Coherence with CS magnet	BS oplev	Takaaki Yokozawa	109	??	Bruco	
36	2019/09/16 6:46:32	unknown	--	10235	Coherence with CS magnet	BS oplev	Takaaki Yokozawa	115	??	Bruco	
37	2019/09/16 6:47:20	unknown	--	10235	Coherence with CS magnet	ITMX and ITMY yaw	Takaaki Yokozawa	128.3	??	Bruco	
38	2019/09/16 6:47:28	unknown	--	10235	Coherence with CS magnet	ITMX and ITMY yaw	Takaaki Yokozawa	256.7	??	Bruco	
39	2019/09/16 6:48:02	unknown	--	10235	Coherence with CS magnet	Ground?	Takaaki Yokozawa	233.3	??	Bruco	
40	2019/09/16 6:48:46	Vacuum pump	--	10235	Maybe vibration from the PF	PR2 POP	Takaaki Yokozawa	313.5	??	Bruco	
41	2019/09/16 6:49:13	Vacuum pump	--	10235	Sound issue	?	Takaaki Yokozawa	435.4	??	Bruco	
42	2019/09/16 6:49:19	Vacuum pump	--	10235	Sound issue	?	Takaaki Yokozawa	525	??	Bruco	
43	2019/09/16 6:50:35	Vacuum pump	--	10245	There is large magnetic fiek	magnetic field	Takaaki Yokozawa	84	??	Portable Mag	
44	2019/09/16 6:53:01	unknown	Suddenly appear and	10303	46.6Hz first discovered from	Type-A suspension	Takaaki Yokozawa	46.6	??	oplev	
45	2019/09/16 6:54:47	all area	??	10313	We measured with turning c	roots pump	Takaaki Yokozawa	285	??	accelerometer	
46	2019/09/16 6:55:58	PSL room	??	10390	Observed with the PSL roor	??	Takaaki Yokozawa	41.2	??	accelerometers	
47	2019/09/16 6:56:07	PSL room	??	10390	Observed with the PSL roor	??	Takaaki Yokozawa	23.9	??	accelerometers	
48	2019/09/16 6:56:15	PSL room	??	10390	Observed with the PSL roor	??	Takaaki Yokozawa	46.2	??	accelerometers	