

# List of RF Cables to Purchase for Early Phase of bKAGRA

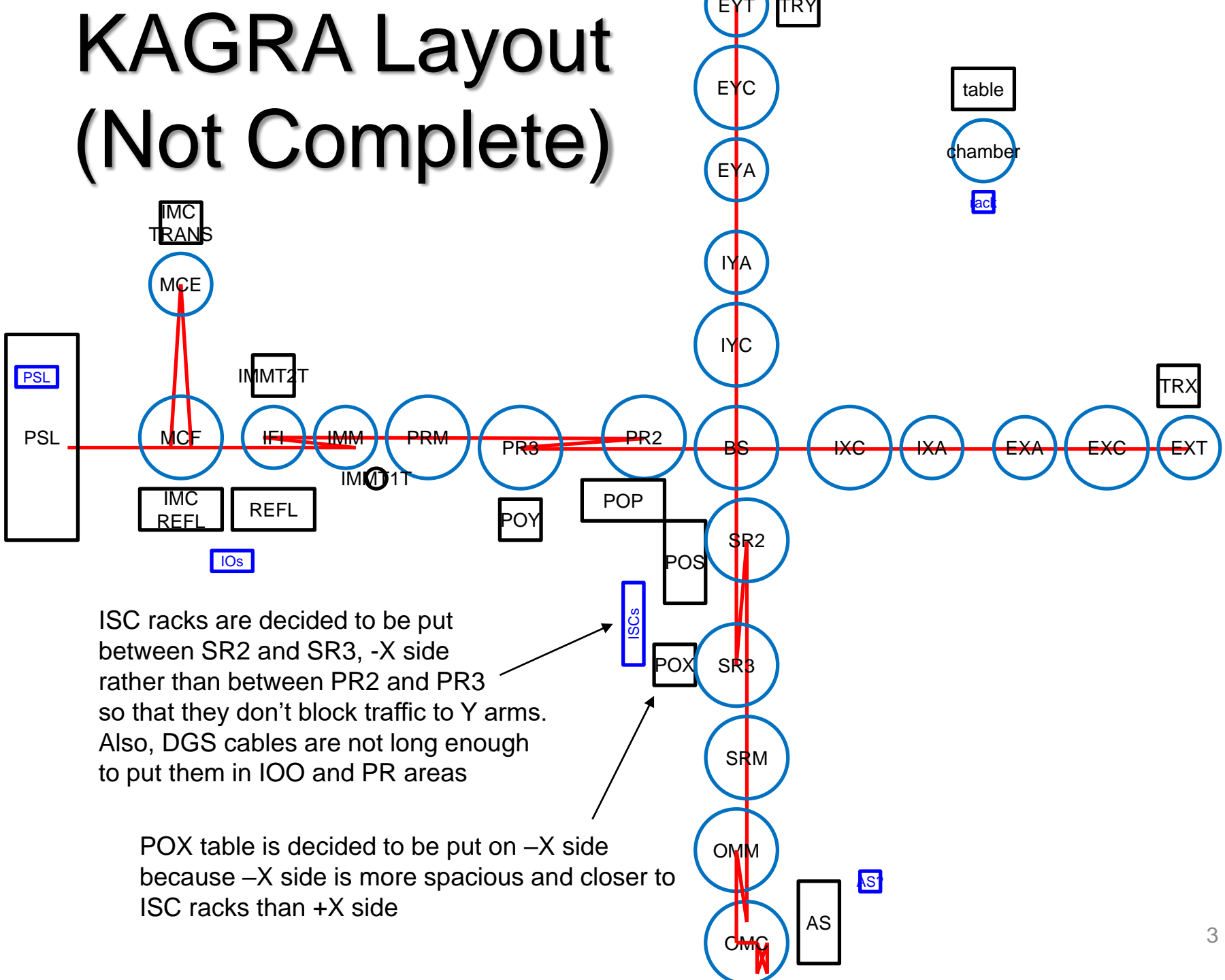
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# References

- List of PDs and QPDs  
<https://docs.google.com/spreadsheets/d/1EcuZOQP8yrD3s7no9PPGSxSD0V3NGAFvx799leWH-1U/edit#gid=2019224000>
- List of electronics for ISC  
<http://gwwiki.icrr.u-tokyo.ac.jp/JGWwiki/KAGRA/Subgroups/MIF/AEL>
- ISC Electrical Components Layout  
<https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=2986>
- RF Cabling Policy  
<https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=3190>
- Cable lengths for iKAGRA ISC  
<https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=3028>

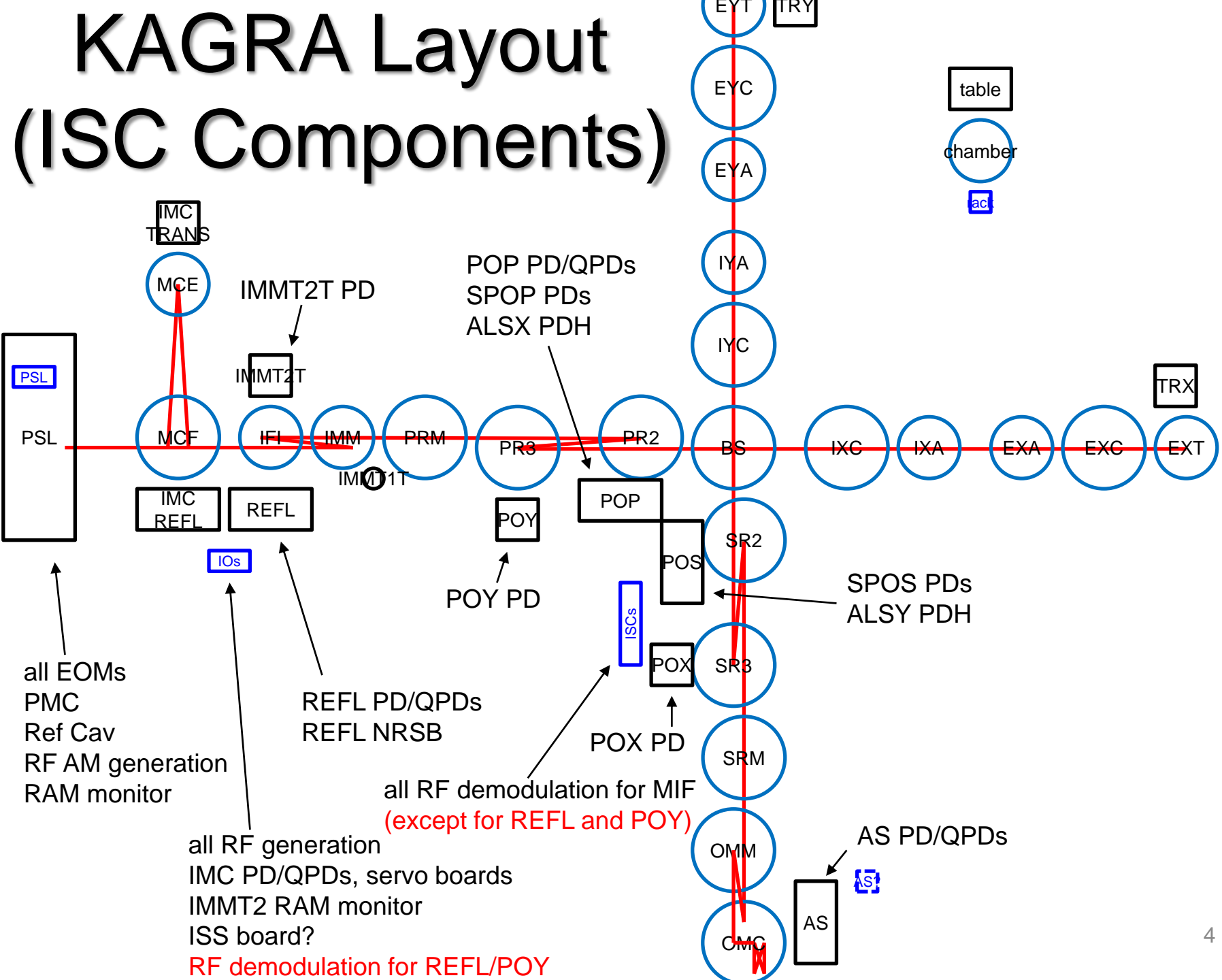
# KAGRA Layout (Not Complete)



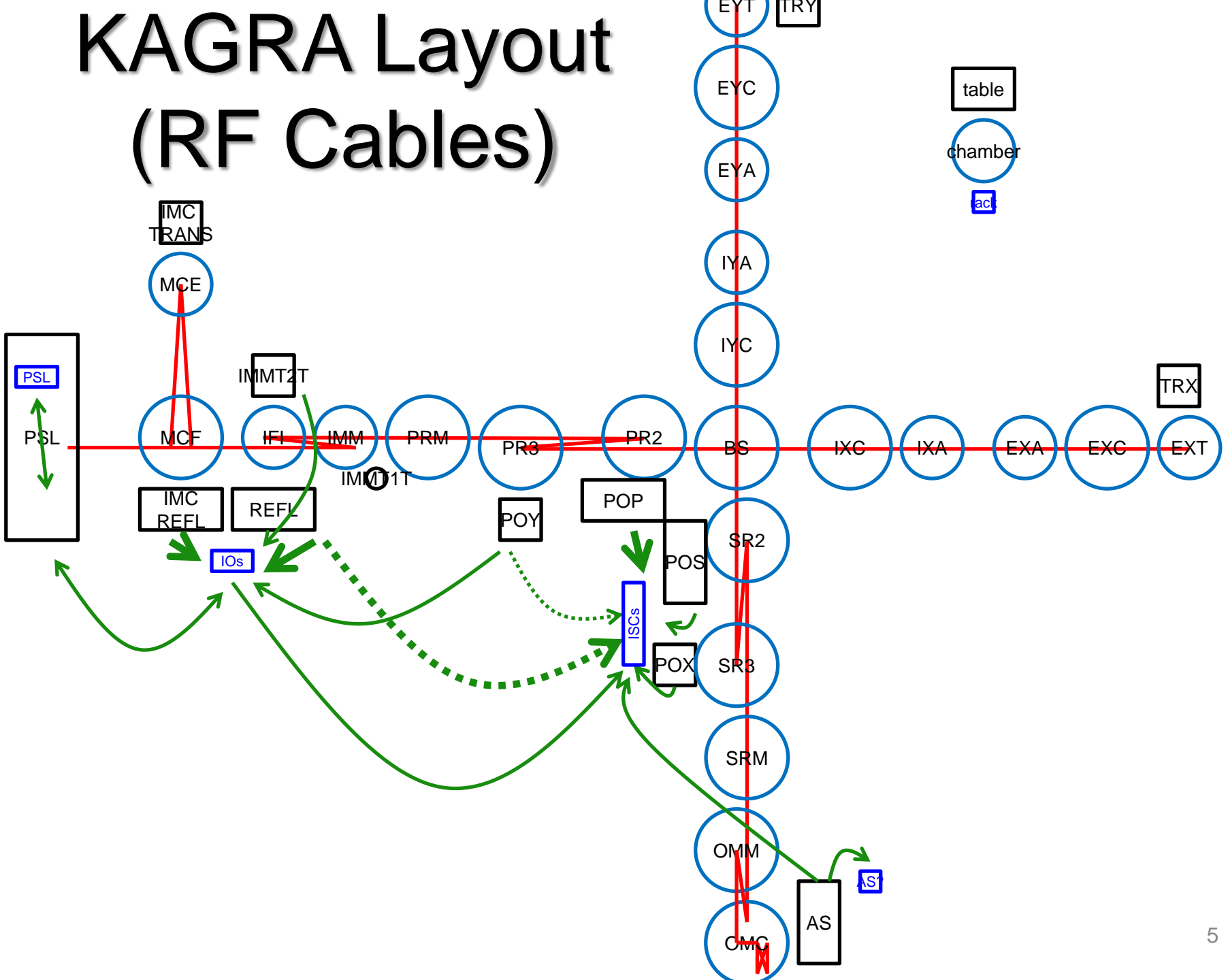
ISC racks are decided to be put between SR2 and SR3, -X side rather than between PR2 and PR3 so that they don't block traffic to Y arms. Also, DGS cables are not long enough to put them in IOO and PR areas

POX table is decided to be put on -X side because -X side is more spacious and closer to ISC racks than +X side

# KAGRA Layout (ISC Components)



# KAGRA Layout (RF Cables)



# Number of RF Cables

- PSL table ↔ PSL rack **2 cables** 15MHz EOM, 51.72MHz EOM
- PSL table ↔ IOO rack **13 cables** ALSX EOM, ALSY EOM, ALSX BEAT, ALSY BEAT, f2/fIMC EOM, f1/f3 EOM x2, AM delay line RFPD, RAM MON(fIMC/spare)
- IMC REFL table ↔ IOO rack **9 cables** IMCR(fIMC), IMCR QPDx2(fIMC)
- REFL table ↔ IOO rack **20 cables** REFL(f1/f2), REFLNRSB(f3-f1/f3-f2), REFL QPDx2(f1/f2)
- IMMT2 table ↔ IOO rack **2 cables** RAM MON(f1/f2)
- POP table ↔ ISC rack **21 cables** POP(f1/f2), SPOP(2\*f1/2\*f2), POP QPDx2(f1/f2), ALSX PDH
- POS table ↔ ISC rack **3 cables** SPOS(2\*f1/2\*f2), ALSY PDH
- POX table ↔ ISC rack **3 cables** POX(f1/f2)
- POY table ↔ IOO rack **3 cables** POY(f1/f2)
- AS table ↔ AS rack **9 cables** AS(f1), AS QPDx2(f1)
- ISC rack ↔ AS rack **2 cables** f1, f2
- IOO rack ↔ ISC rack **6 cables** f1, f2, 2\*f1, 2\*f2, f3-f2, f3-f1
- Misc. intra-rack, intra-table **~100 cables ?**

Cables for in-vac RF PDs and RF QPDs not included!!

# Length of RF Cables

- PSL table ↔ PSL rack **5 m**
- PSL table ↔ IOO rack **30 m**
- IMC REFL table ↔ IOO rack **10 m** (measured to be ~7 m)
- REFL table ↔ IOO rack **10 m** (measured to be ~7 m) 50 m if connected to ISC racks
- IMMT2 table ↔ IOO rack **10 m** (measured to be ~ 8 m)
- POP table ↔ ISC rack **30 m** (measured to be ~23 m) 20 m if no use of ladder close to ISC racks
- POS table ↔ ISC rack **20 m** (measured to be ~18 m)
- POX table ↔ ISC rack **20 m** (measured to be ~19 m)
- POY table ↔ IOO rack **20 m** (measured to be ~17 m) 40 m if connected to ISC racks
- AS table ↔ AS rack **10 m** (AS rack position unsure) 40 m if connected to ISC racks
- ISC rack ↔ AS rack **40 m** (measured to be ~37 m)
- IOO rack ↔ ISC rack **50 m** (measured to be ~45 m)
- Misc. intra-rack, intra-table **1 m, 2 m**

Cables for in-vac RF PDs and  
RF QPDs not included!!

# Cables to Purchase

- HUBER+SUHNER S04272B SMA-SMA
  - 1 m: 20 cables (reduced from 50)
  - 2 m: 20 cables (reduced from 50)
  - 5 m: 10 cables (at least 2)
  - 10 m: 50 cables (at least 11→40)
  - 20 m: 10 cables (at least 27→9)
  - 30 m: 40 cables (at least 13→33)
  - 40 m: 10 cables (at least 12→2)
  - 50 m: 10 cables (at least 26→6)
- (roughly xxx man-yen, 2 months)

## Comment from Kiwamu

- aLIGO uses flexible cables and SMA-SMA patch panels for RF PD and RF QPDs
  - Heliax cables are used only for RF distribution
  - Number of connectors, not cable length, matters for losses
- We will also use flexible SMA cables for RF PD and RF QPDs

Cables for in-vac RF PDs and  
RF QPDs not included!!



# Cabling Photos

PSL table ↔ IOO rack

PSL

IOO racks

2 m



IMC REFL table ↔ IOO rack

クリーンエリア  
作業用以外  
入禁止  
東京大学

IMC REFL

IOO racks



REFL table ↔ IOO rack

RFPI 室  
remote desktop

これより先ハザードエリア  
メガネをおかけください。

hazard area beyond this point  
please wear safety goggles.

USE IR & GREEN GLASS



REFL (not seen)

クリーンエリア  
立入禁止



100 PR area to 100 racks

POY table  
(not installed yet)

2 m

Cable rack under  
PR2-PR3 pipe  
(not installed yet)



**POP table to ISC racks**



POP table

3 m



ISC racks

ISC racks  
(not installed yet)

POS table  
(not installed yet)



3m

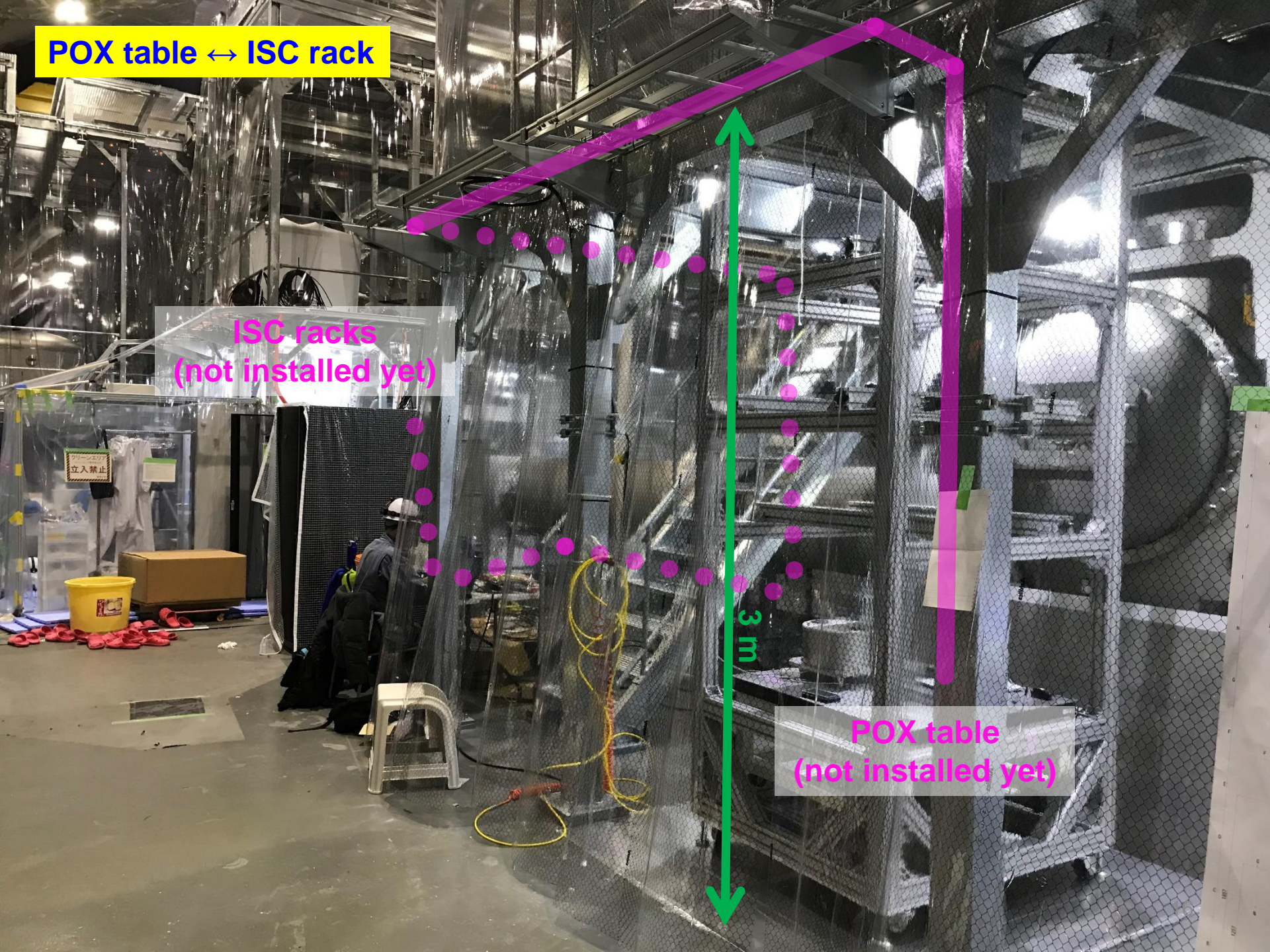


POX table ↔ ISC rack

ISC racks  
(not installed yet)

3 m

POX table  
(not installed yet)





AS rack ↔ ISC rack

ISC racks  
(not installed yet)

cabling through -X side

3.5 m

AS table

