

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

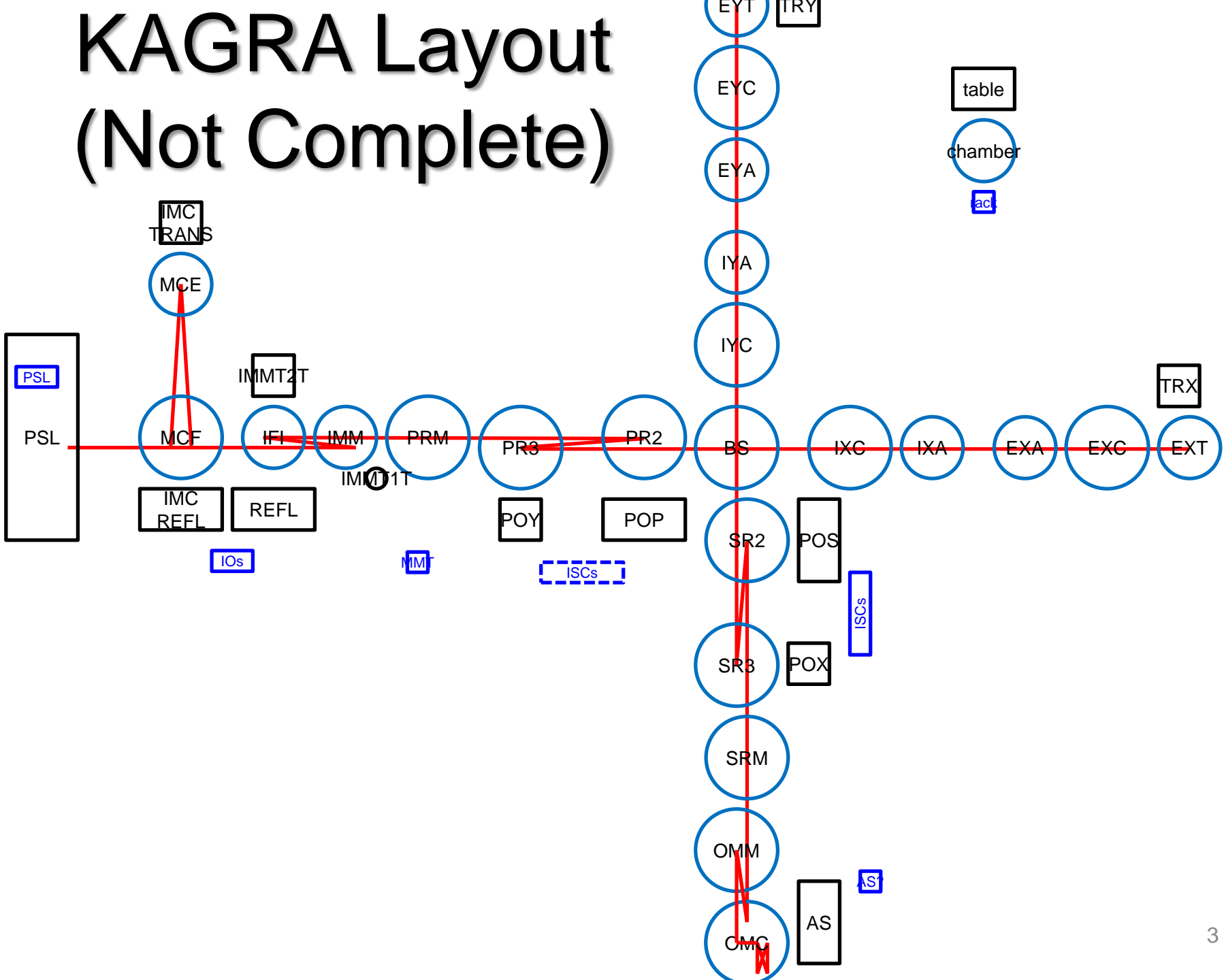
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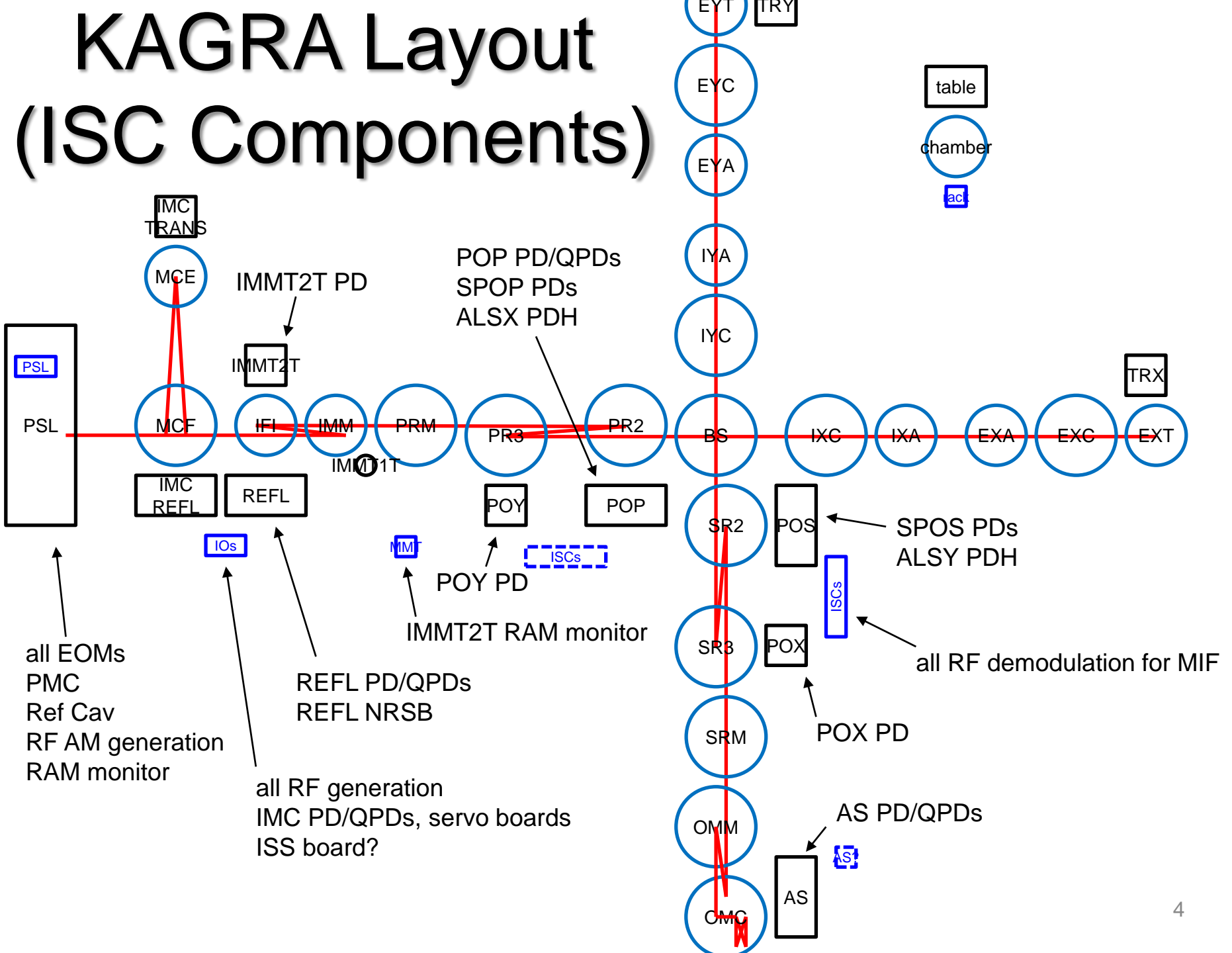
# References

- 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>

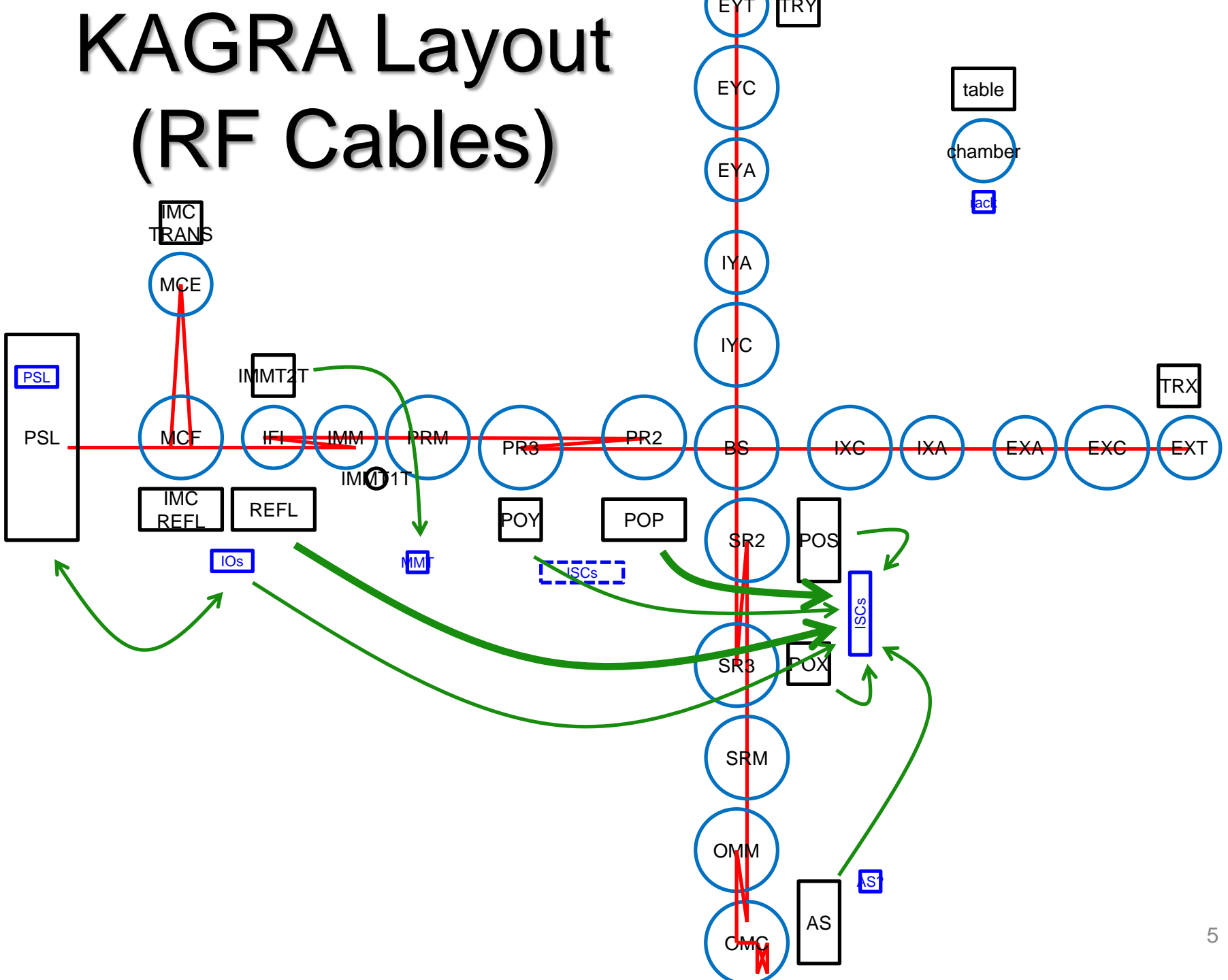
# KAGRA Layout (Not Complete)



# 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 ↔ ISC rack **20 cables** REFL(f1/f2), REFLNRSB(f3-f1/f3-f2), REFL QPDx2(f1/f2)
- IMMT2 table ↔ MMT 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 ↔ ISC rack **3 cables** POY(f1/f2)
- AS table ↔ ISC rack **9 cables** AS(f1), AS QPDx2(f1)
- IOO rack ↔ MMT 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**
  - REFL table ↔ ISC rack **30 m (50 m if ISC racks at SR side)**
  - IMMT2 table ↔ MMT rack **10 m**
  - POP table ↔ ISC rack **20 m (30 m if ISC racks at SR side)**
  - POS table ↔ ISC rack **40 m (20 m if ISC racks at SR side)**
  - POX table ↔ ISC rack **30 m (20 m if ISC racks at SR side)**
  - POY table ↔ ISC rack **20 m (30 m if ISC racks at SR side)**
  - AS table ↔ ISC rack **50 m (20 m if ISC racks at SR side)**
  - IOO rack ↔ MMT rack **10 m**
  - IOO rack ↔ ISC rack **30 m (50 m if ISC racks at SR side)**
  - Misc. intra-rack, intra-table **1 m, 2 m**
- There is a fair possibility that ISC racks placed at SR side (between SR2 and SR3?)  
**WE HAVE TO DISCUSS THIS POINT**

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

# Cables to Purchase

- HUBER+SUHNER S04272B SMA-SMA
  - 1 m: 50 cables
  - 2 m: 50 cables
  - 5 m: 10 cables (at least 2)
  - 10 m: 30 cables (at least 13)
  - 20 m: 40 cables (at least 23; 15 if ISC racks at SR side)
  - 30 m: 80 cables (at least 41; 24 if ISC racks at SR side)
  - 40 m: 20 cables (at least 3; 0 if ISC racks at SR side)
  - 50 m: 40 cables (at least 9; 26 if ISC racks at SR side)
- (roughly 800 man-yen, 2 months)

## Comment from Kiwamu

- aLIGO uses flexible cables and SMA-SMA patch panels for RF PD and RF QPDs
  - Helix 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!!