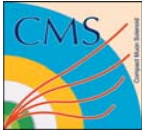




# RE4 GROUNDING AND SHIELDING SCHEME

**Flavio Loddo**  
*INFN-Bari*

on behalf of RPC Group

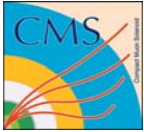


## Recommendations from ESR

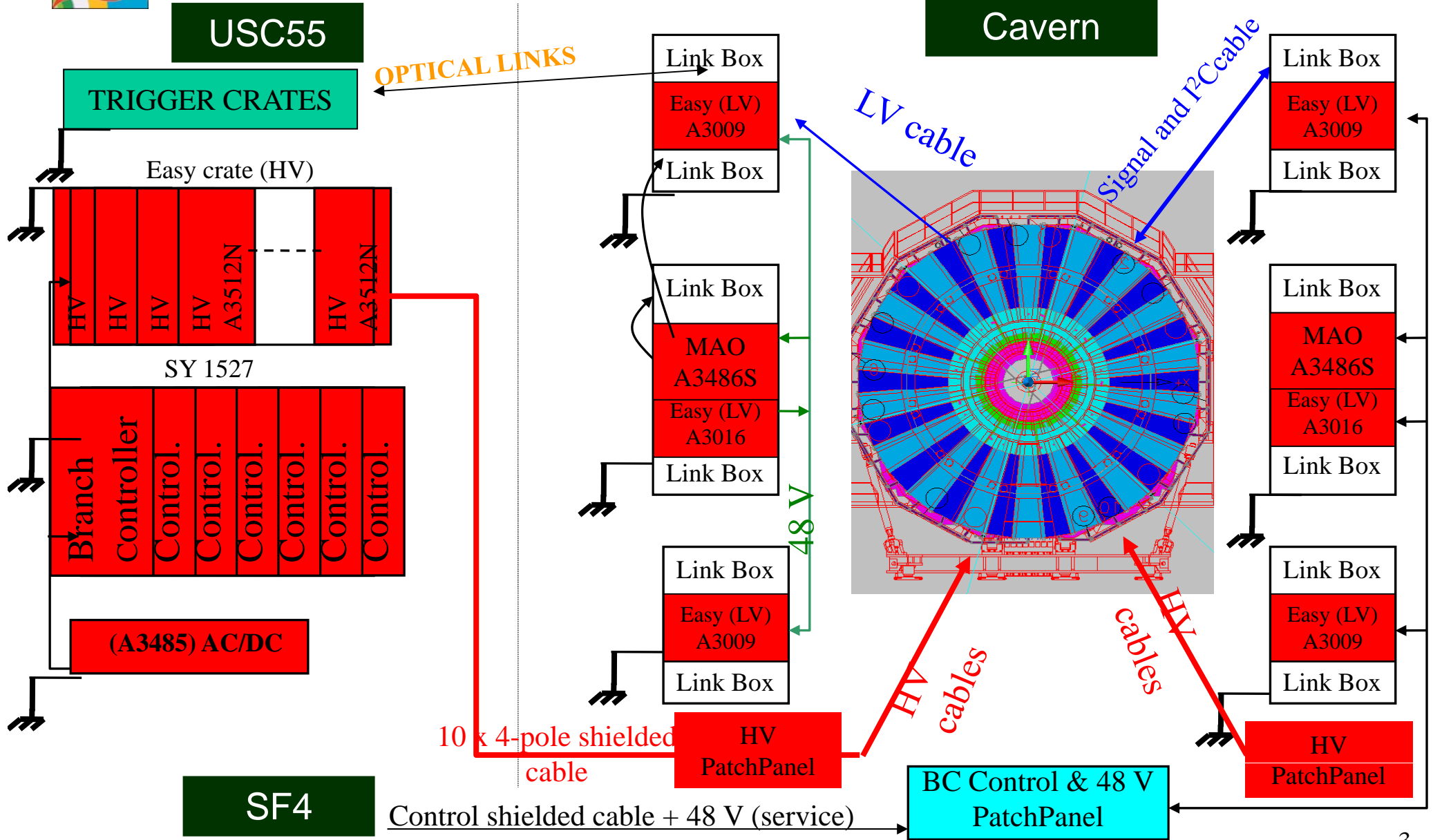
The RE4 grounding and shielding scheme was presented during the **Electronic System Review** of RE4 electronic system on Wednesday 14<sup>th</sup> of March 2012

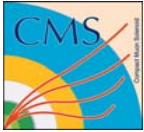
- The baseline internal and external grounding schemes need to be defined, documented, and agreed with CSC ME4/2, in particular what concerns the connection to the CMS iron.
- We should equip one RE4 with all electronics, cables and services to check:
  - effectiveness of Aluminum Enclosure → in case improve the electrical connections between panels and C-bars using star-washers
  - try to evaluate the effectiveness of internal grounding connections
  - play with shielding connections
  - study how to increase the robustness of DGND-AGND connection while keeping or even improving analogue performance of the front end system.

**My proposal: 25-29 June at 904**



# OVERALL ELECTRONICS AND CABLING SCHEME

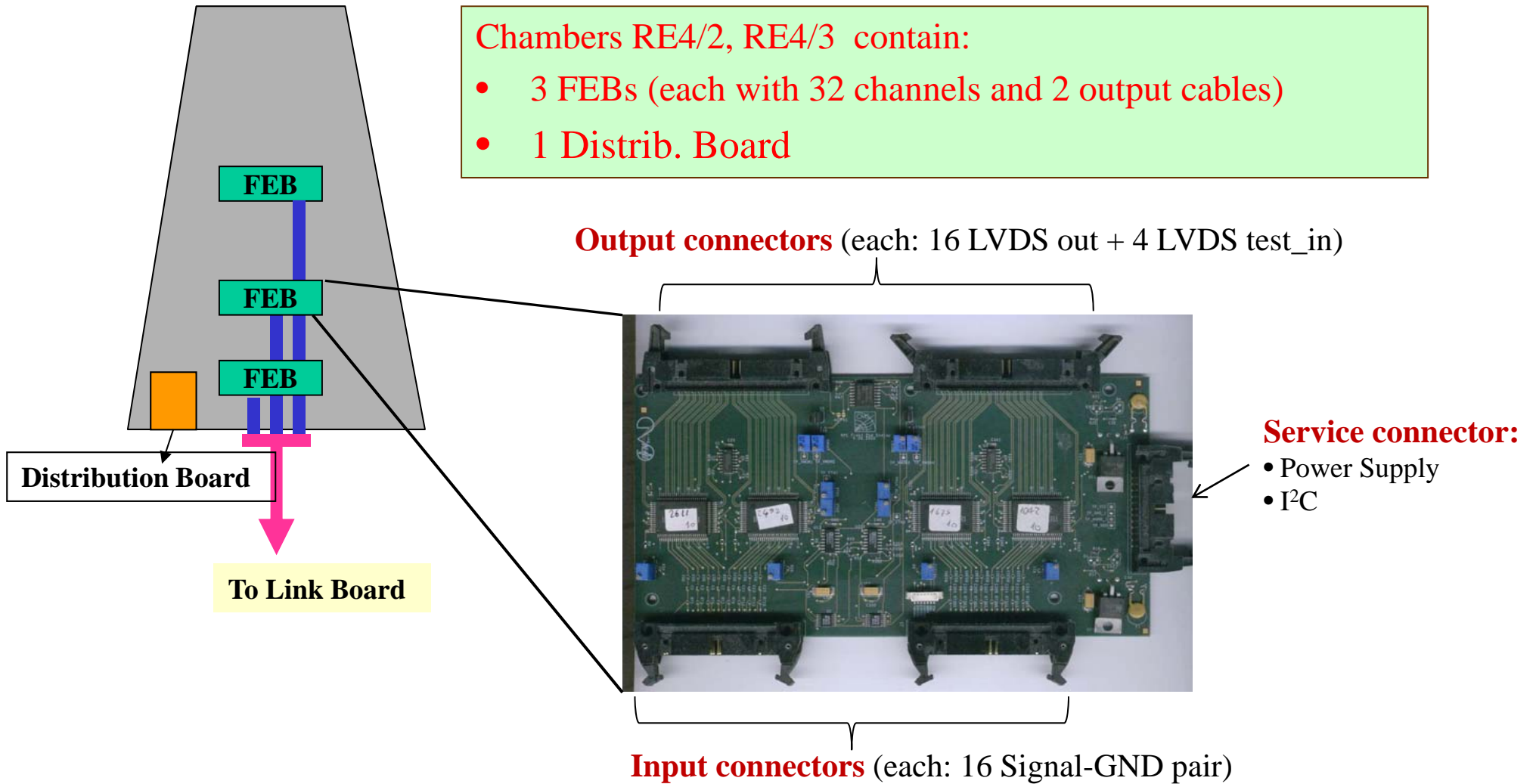


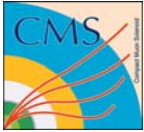


# Chamber Layout

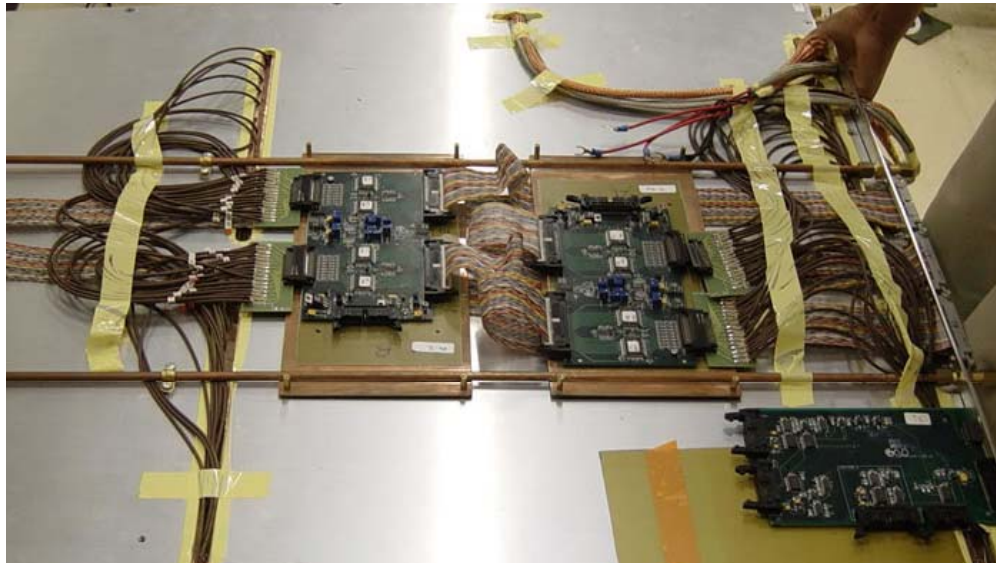
Chambers RE4/2, RE4/3 contain:

- 3 FEBs (each with 32 channels and 2 output cables)
- 1 Distrib. Board





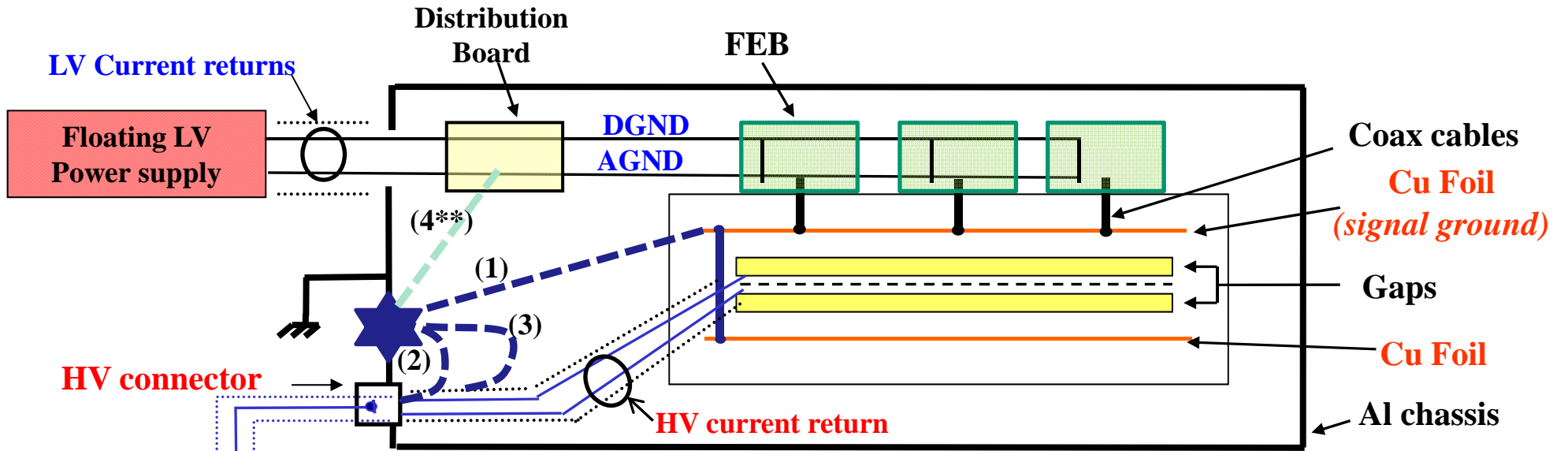
## Chamber Layout



- The FEBs are connected to **input strips** with coaxial cables through adapter boards
- The **output cables** are:
  - twisted flat cables inside the chambers, until the front panel
  - round, shielded and twisted from front panel to Link Boards
- The **power cables** are:
  - round/shielded from LV Board (A3009) to Distribution Board
  - flat cable from Distribution Board to FEBs (connected in parallel)



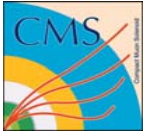
# Proposed internal GND connections



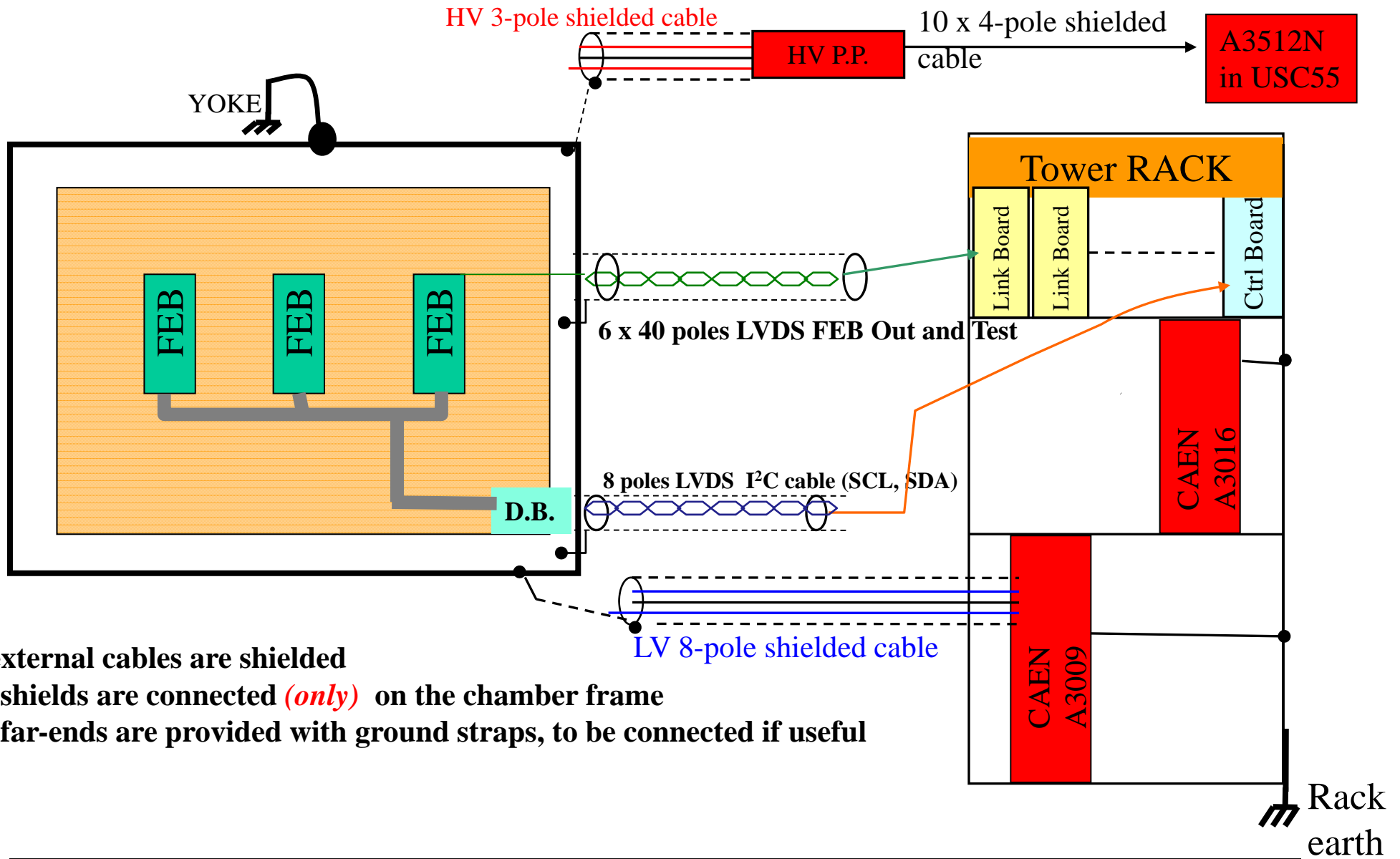
- Define the **STAR Center** on the front panel (close to HV connector)
  - (1) Connect the Cu Foil (AGND) to Star Center with Cu braid
  - (2) Connect the HV c.r. (from HV connect.) to Star Center with Cu braid
  - (3) Connect the shield of internal HV cable to Star Center with Cu braid
  - (4\*\*) In the installed chambers, there is the connection between the AGND of Dist. Board. May be not needed/"dangerous" → to be studied

- **The Al enclosure must be tied to safety GND**
  - RPC is mechanically connected to Yoke
  - Proper connection (short) from Chamber to Yoke with wide Cu braid

- **LV-HV-Signal-DCS shields connected to front-panel with short connections**



# Proposed shielding connections



- All external cables are shielded
- The shields are connected (*only*) on the chamber frame
- The far-ends are provided with ground straps, to be connected if useful





# Summary

- The baseline of RE4 grounding and shielding scheme is well defined
- Some further studies for optimization are required
- The week 25-29 June is proposed for testing in 904

## HW/SW Requirements:

- One chamber (RE4-like) equipped with new FEB/DB (also to give final validation to PK production)
- Threshold control
- Receiver + Scaler to measure the noise rate OR (better) a DAQ system for full chamber readout
  
- At the same time, if a Barrel chamber is available, we can test the new Dist. Board