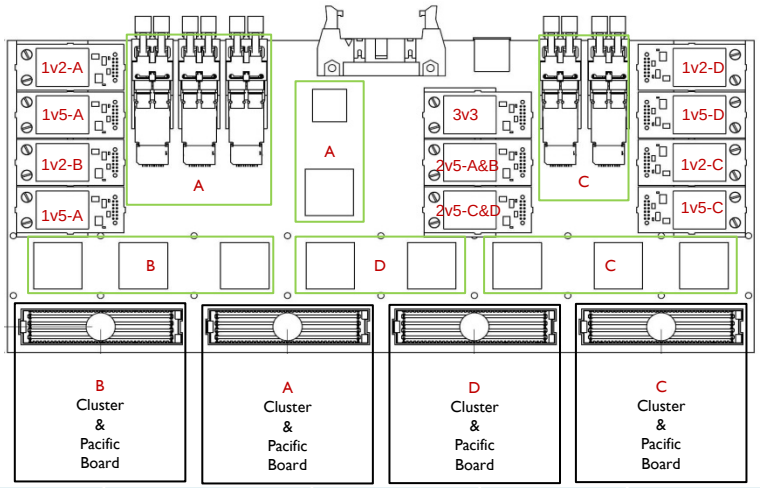
SciFi power supply requirements

½ Read Out Box power supplies



Power Supply	Current(mA) / Power(W)	Efficiency (%)	Power loss(w)	Power In(W)
1v2-A	2133/2,56	74	0,89	3,46
1v2-B	2133/2,56	74	0,89	3,46
1v2-C	2133/2,56	74	0,89	3,46
1v2-D	2133/2,56	74	0,89	3,46
1v5-A	2321/3,48	77	1,04	4,52
1v5-B	2904/4,36	74	1,53	5,89
1v5-C	2904/4,36	74	1,53	5,89
1v5-D	2232/3,35	76	1,06	4,41
2v5-A	1850/4,63	84	0,88	5,51
2v5-B	1600/4,00	84	0,76	4,76
3v3-A				Negligible
Total:			**10,74**	**44,82**

- Total estimated (no margin) power consumption for ½ ROB: ~45W,
  - With 10% safety factor : ~50W
- Total power consumption for the SciFi FE-electronics
  - 576 ROBs x ~50W ≈ 30kWatt
  - Without power cable loss. Power distribution from power supplies to detector not yet known, we assume same current per cable as the current outer tracker with a voltage drop of 1 volt over the cables
  - Power needed ≈ 7/6 * 30k = 35kW
- Available Outer Tracker Wiener Maraton power supplies:
  - 6 power boxes, 12 channels per power box
  - 72 outputs * 300W = 21.6kW
  - Wiener output max 8v/50A
  - Currently configured Vout = 7V, voltage at front end +/- 6V
- Conclusion: we need two times the number of power supplies as used in the current Outer Tracker used ☹
  - Prefer to stay around 60% of the maximum load
  - Load balancing between the power supplies depending on the number of supplies and the detector geometry

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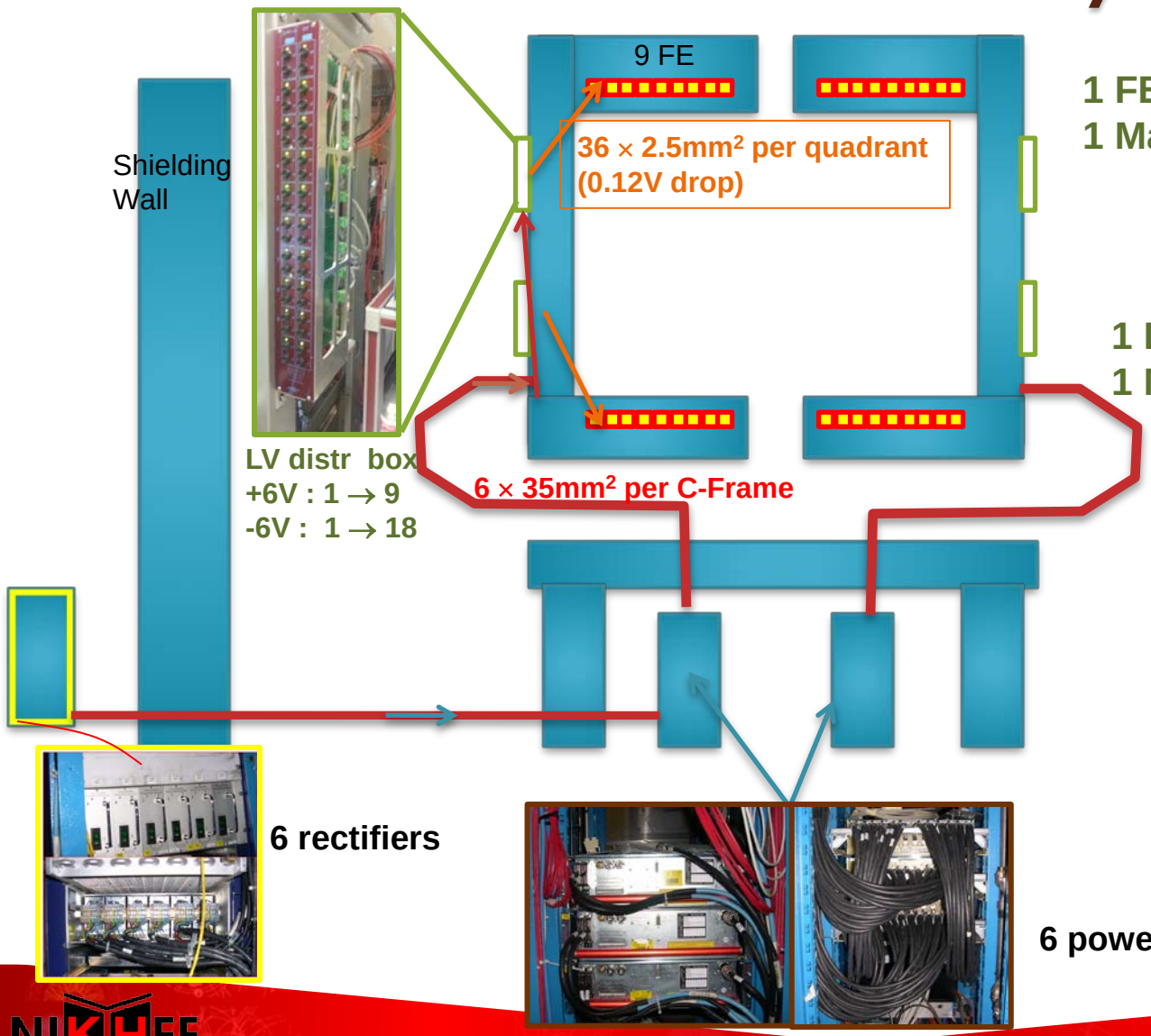
Present Distribution System (OT)

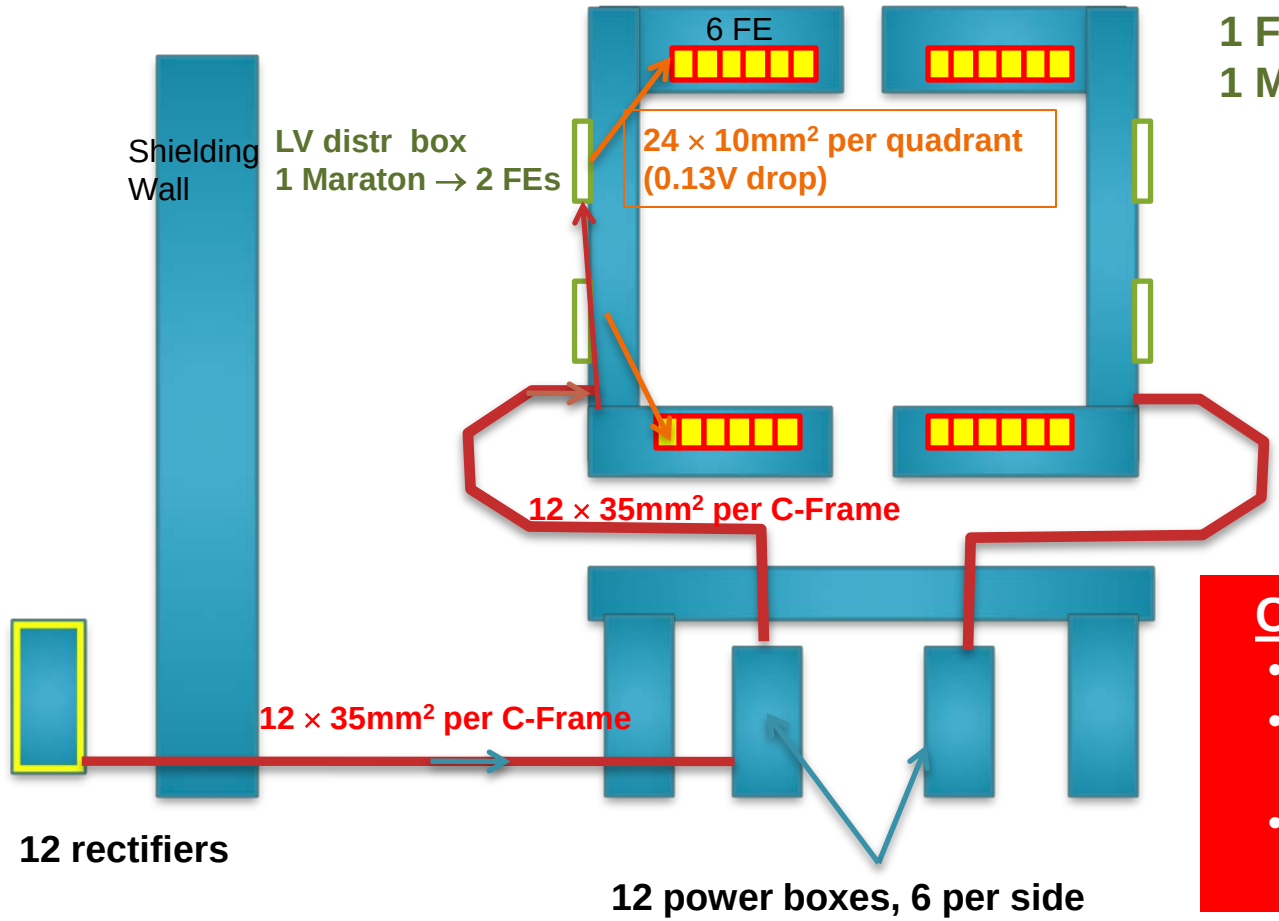


1 FE : 3 A × +6.8 V ≈ 20 W
1 Maraton ch. → 9 FEs
- 180 W (~60% of max)
- 4 cables [(0,+6,-6,0)] per FE

1 FE : 1.2 A × -6.8 V ≈ 8 W
1 Maraton ch. → 18 FEs
- 145 W (~50% of max)

Total
- 48 channels +6V : ~9 kW
- 24 channels -6V : ~3.5 kW

SciFi Distribution (Preliminary!)



1 FE : ≈ 90 W

1 Maraton ch. → 2 FEs

- 200 W including power loss (~67% of max)
- 4 cables [2×(0,6V)] per FE

Total

- 144 channels V : ~30 kW
- 12 Maraton's

Comparison with OT

- # of Maraton's : 6 → 12
- 2× volume of cables in rolling ducts
- 2.7× volume of cables from distribution box to FEs