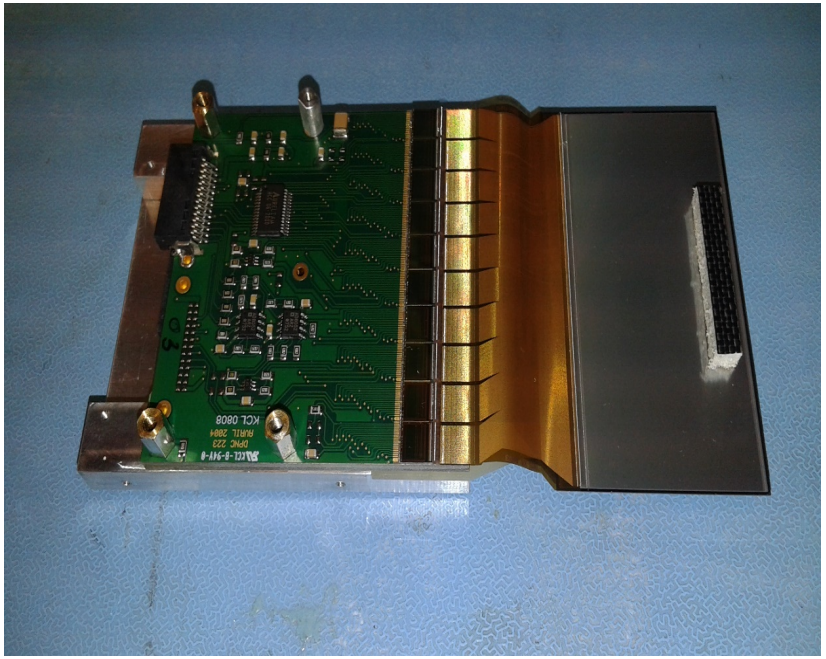
Silicon Detectors from Perugia

Silicon Detectors from Perugia

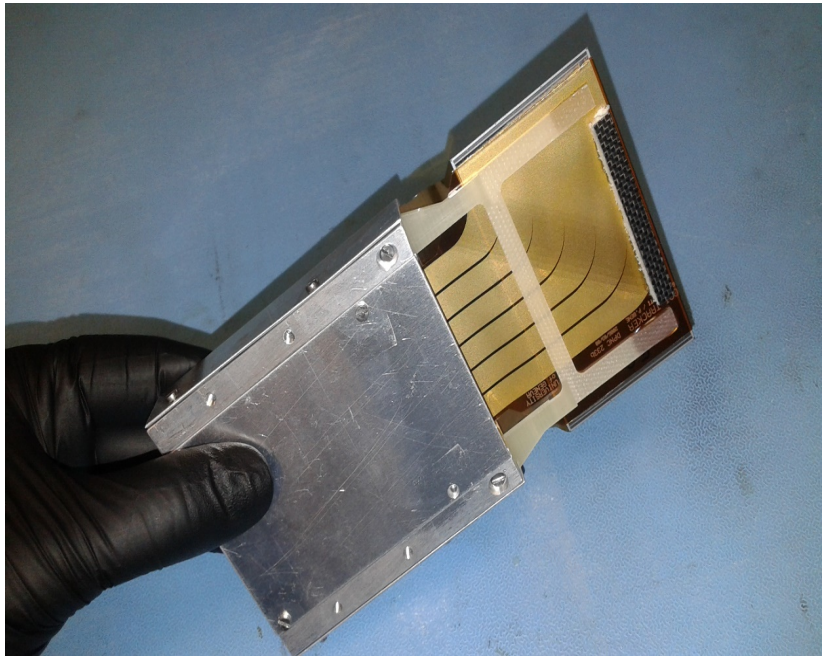
AMS/DAMPE Perugia group

2 (+ 2-3 that can be done) “AMS-mini”:

- 7*4 cm^2
- pitch 110 µm (S), 104 µm (K) [with this pitch on K, the charge measurement is optimal]
- resolution 10 µm (S), 15 µm (K)
- thickness: 300 µm



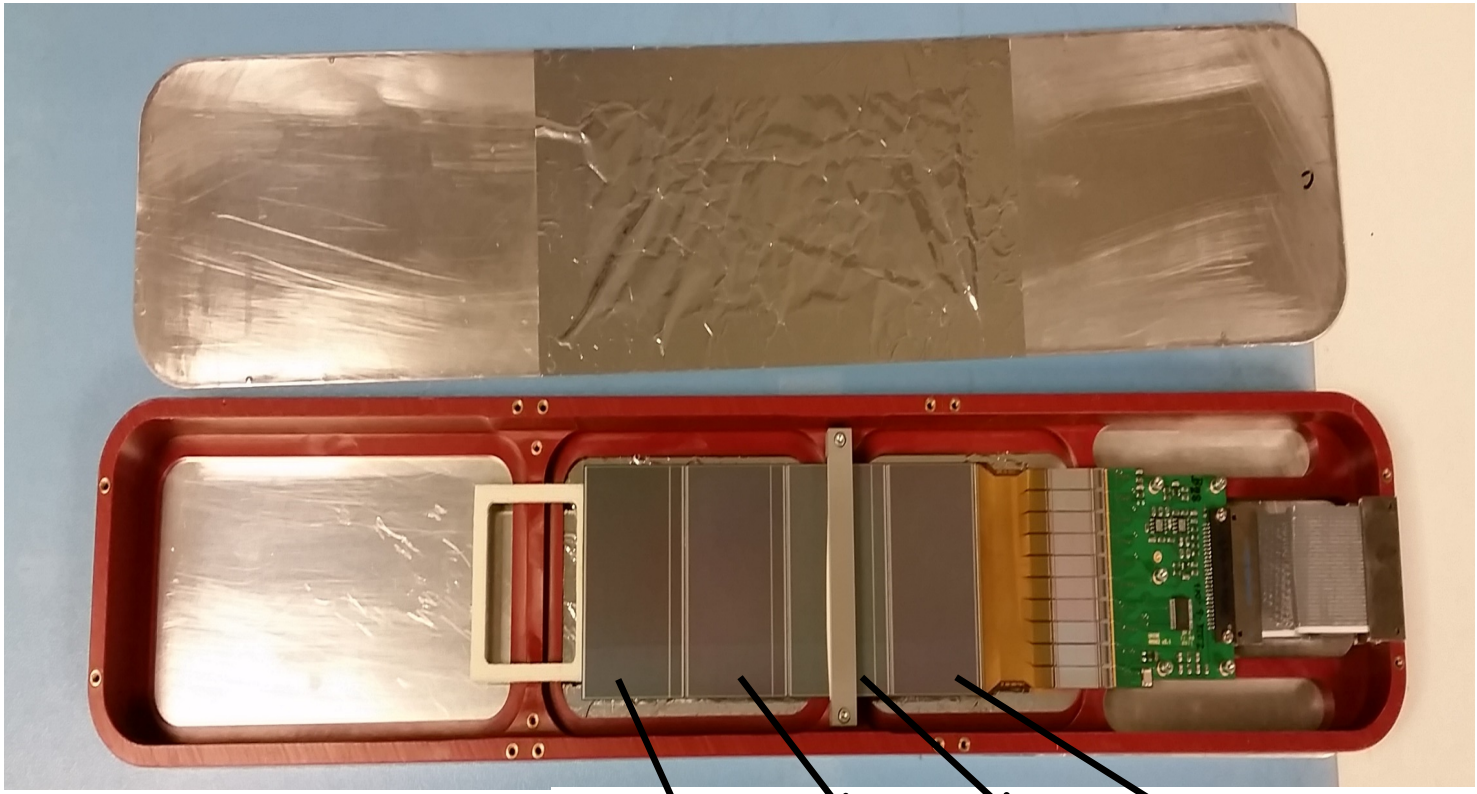
Silicon side (S) – Junction side

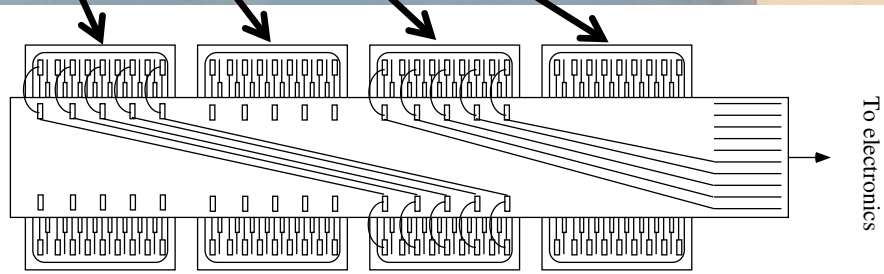


Kapton side (K) – Ohmic side

2 “AMS-short”:

- 7*16 cm^2
- pitch 110 µm (S), 208 µm (K)
- resolution 10 µm (S), 30 µm (K)
- thickness: 300 µm

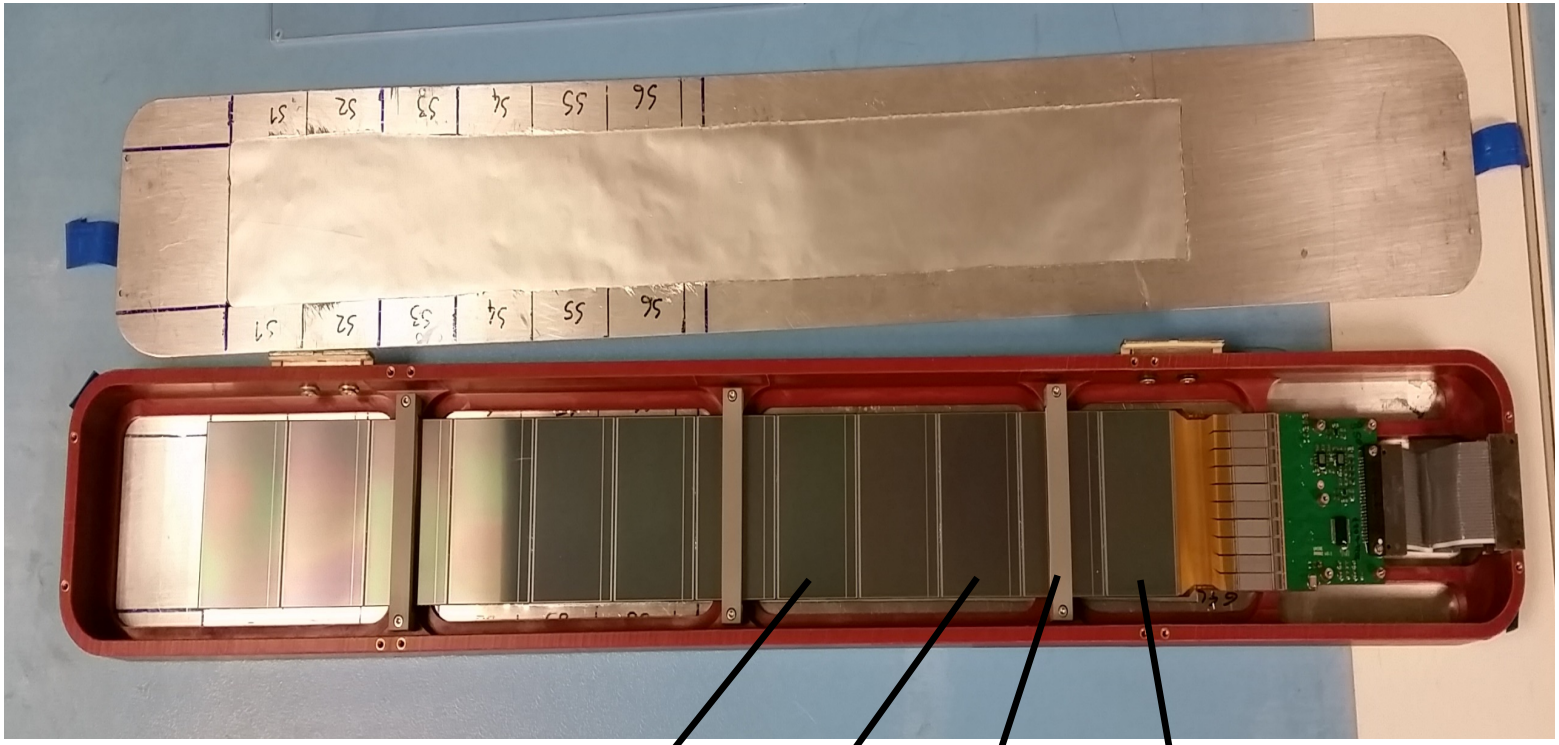


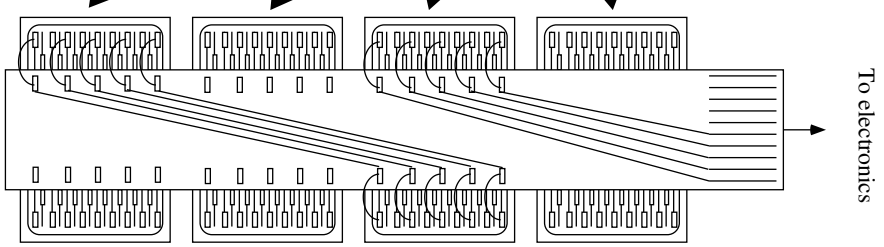


- multiplicity on Kapton side

3 “AMS”:

- 7*[28-48] cm^2
- pitch 110 µm (S), 208 µm (K)
- resolution 10 µm (S), 30 µm (K)
- thickness: 300 µm

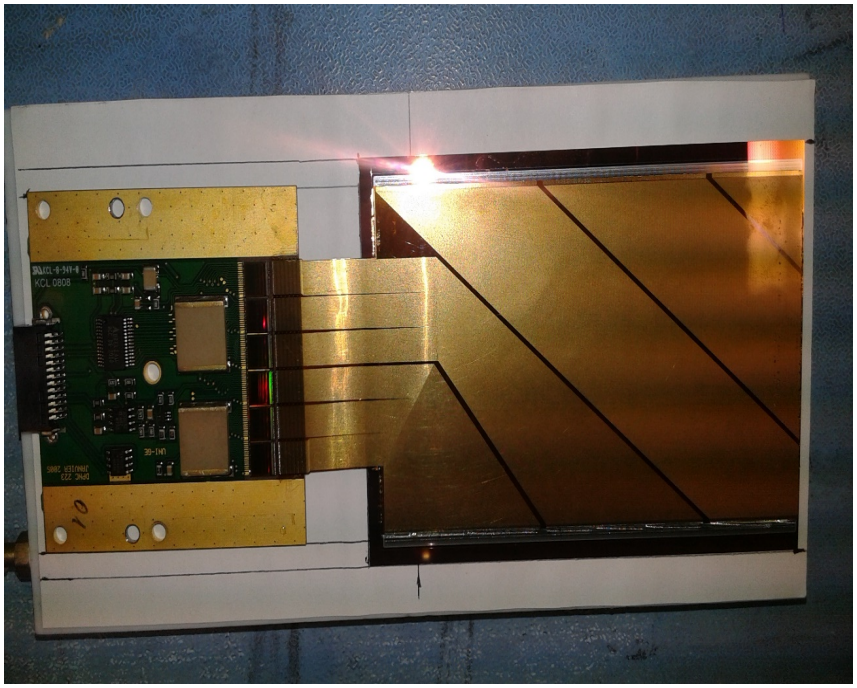


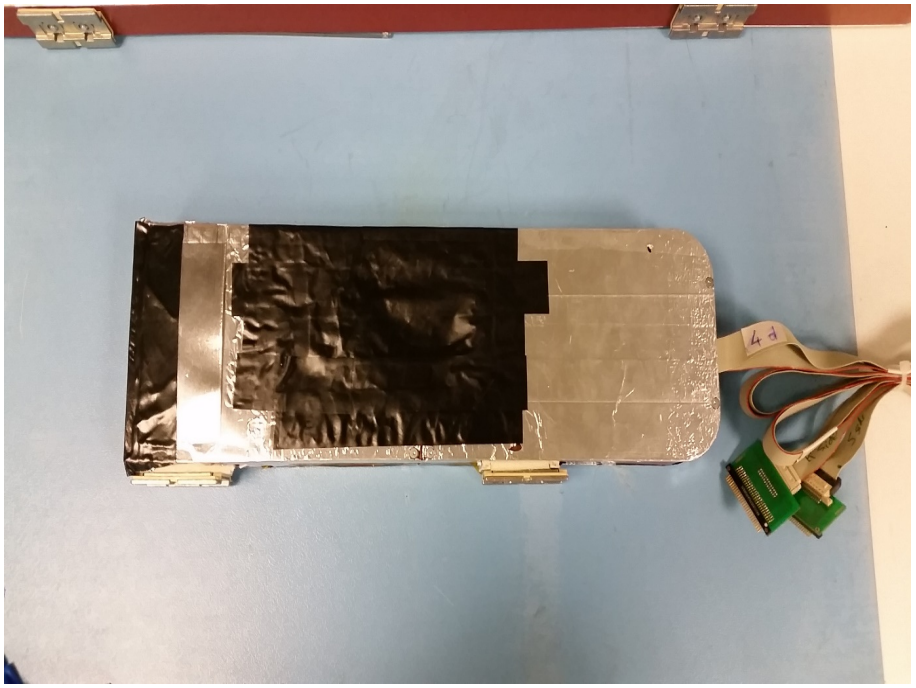


- multiplicity on Kapton side

1 “LIMADOU prototype”:

- 6*7 (7*10) cm^2
- pitch 182 µm (S), 182 µm (K)
- resolution 30 µm (S), 30 µm (K)
- thickness: 300 µm (to be checked)





12 “DAMPE-short”:

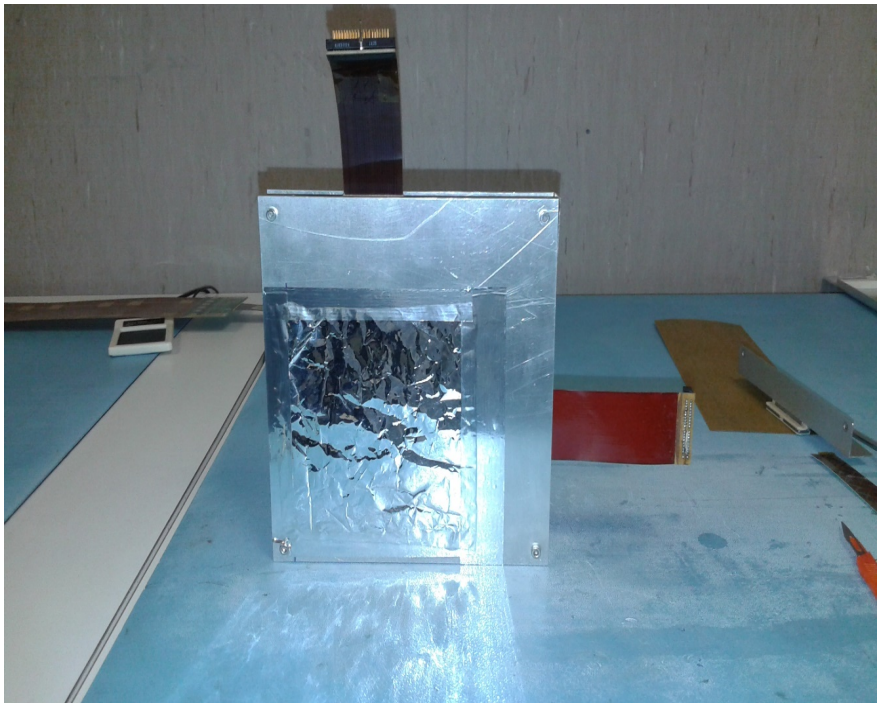
- 9.5*9.5 cm^2
- pitch 240 µm
- resolution 40 µm
- thickness: 320 µm

8 “DAMPE”:

- 9.5*38 cm^2
- pitch 240 µm
- resolution 40 µm
- thickness: 320 µm

1 (i.e. 1+1) “DAMPE double face”:

- 9.5*9.5 cm^2
- pitch 240 µm (S), 240 µm (S)
- resolution 40 µm (S), 40 µm (S)
- thickness: 320 µm + 320 µm

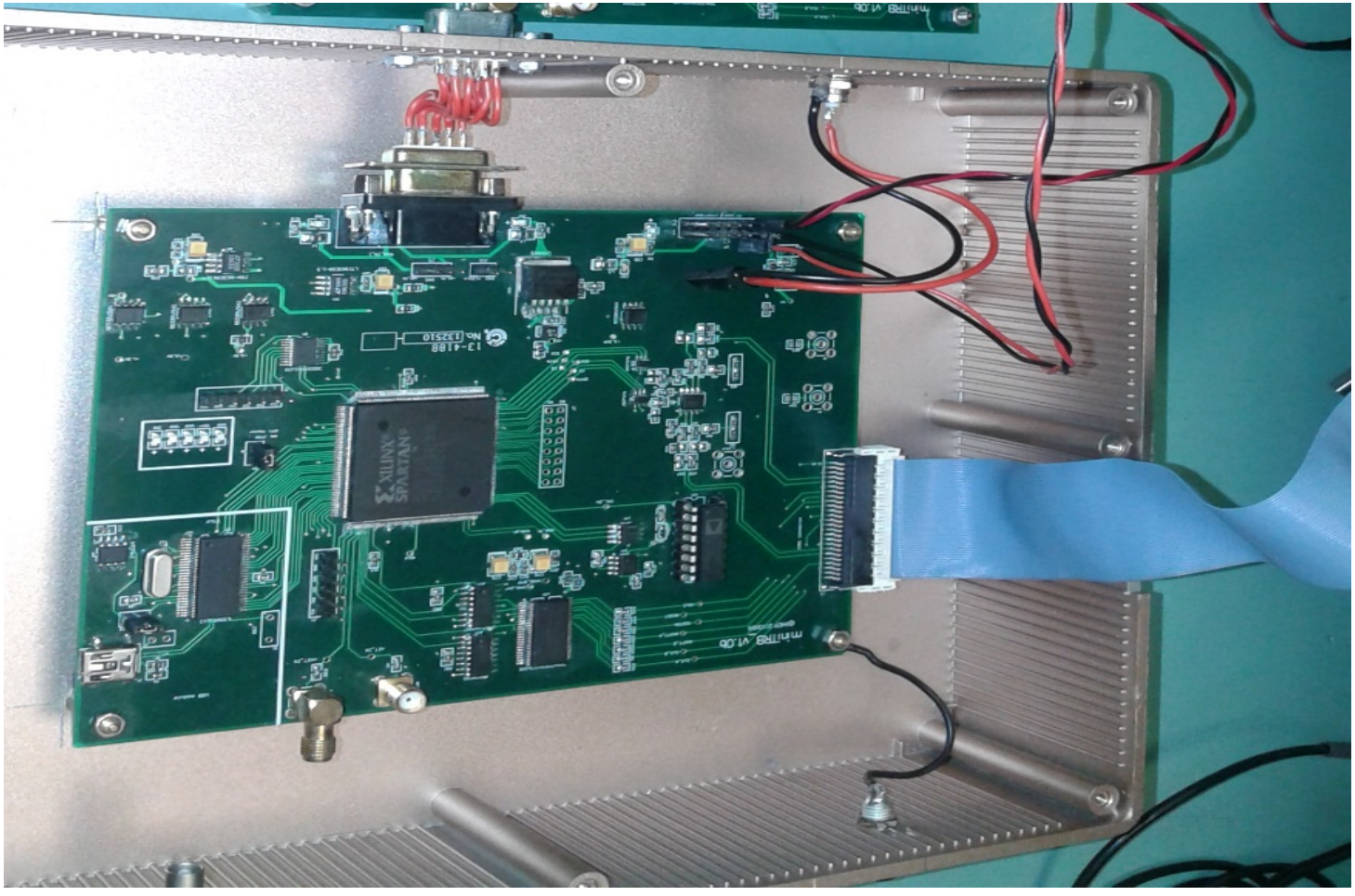


Detectors:

#	Type	Dim. X (mm)	Dim. Y (mm)	Pitch X (µm)	Pitch Y (µm)	Reso X (µm)	Reso Y (µm)	Notes
2 (+2-3)	AMS-mini	70	40	110	104	10	15	
3	AMS	70	[280-480]	110	208	10	30	80 mm Y-multiplicity
2	AMS-short	70	160	110	208	10	30	80 mm Y-multiplicity
1	DAMPE double-face	95	95	240	240	40	40	
8	DAMPE	95	380	240	-	40	-	
12	DAMPE-short	95	95	240	-	40	-	

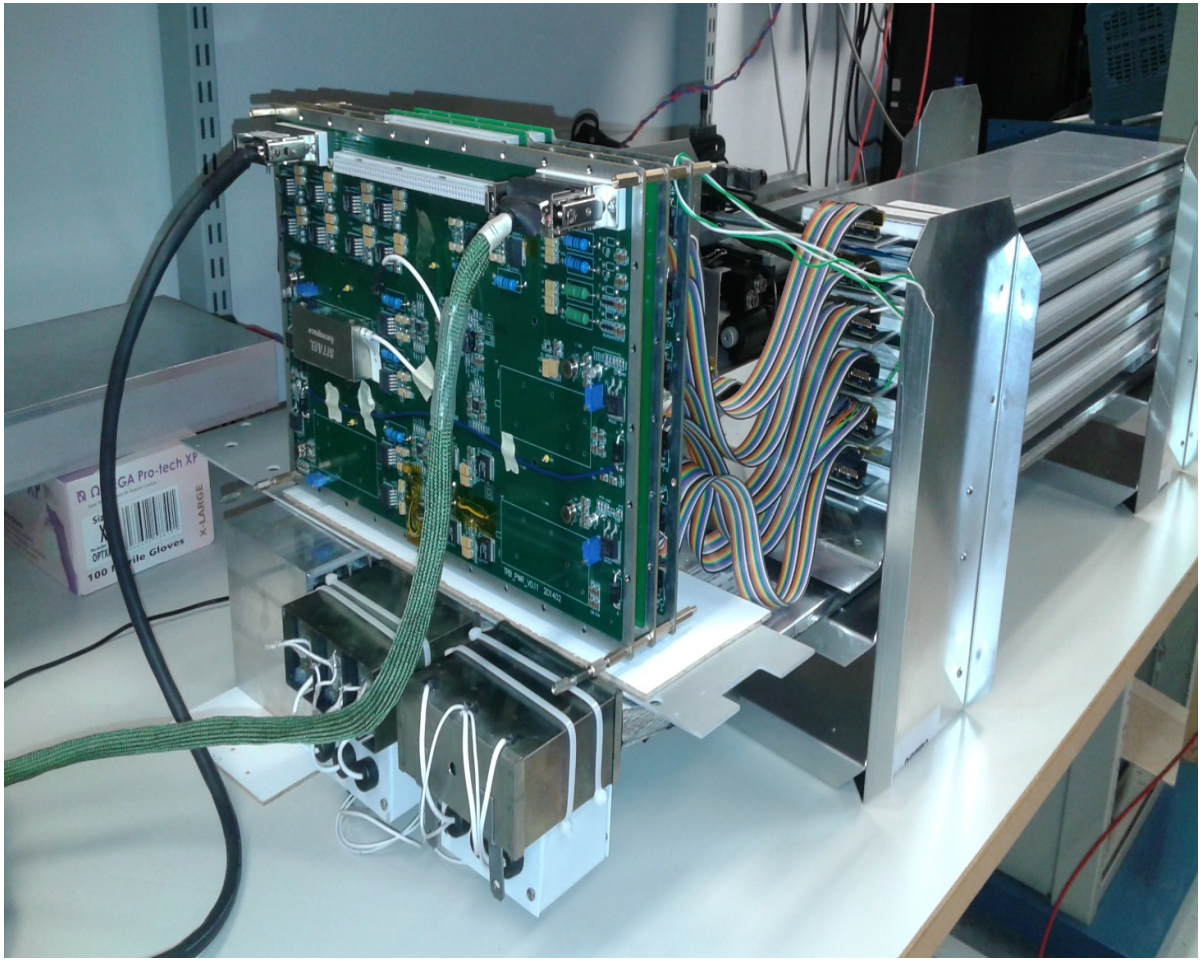
DAMPE mini-TRB:

- single ladder
- up to ~ 50 hz
- NO busy management
- USB → any pc
- cables crate-ladder ~50cm
- cables crate-PC up to ~7m



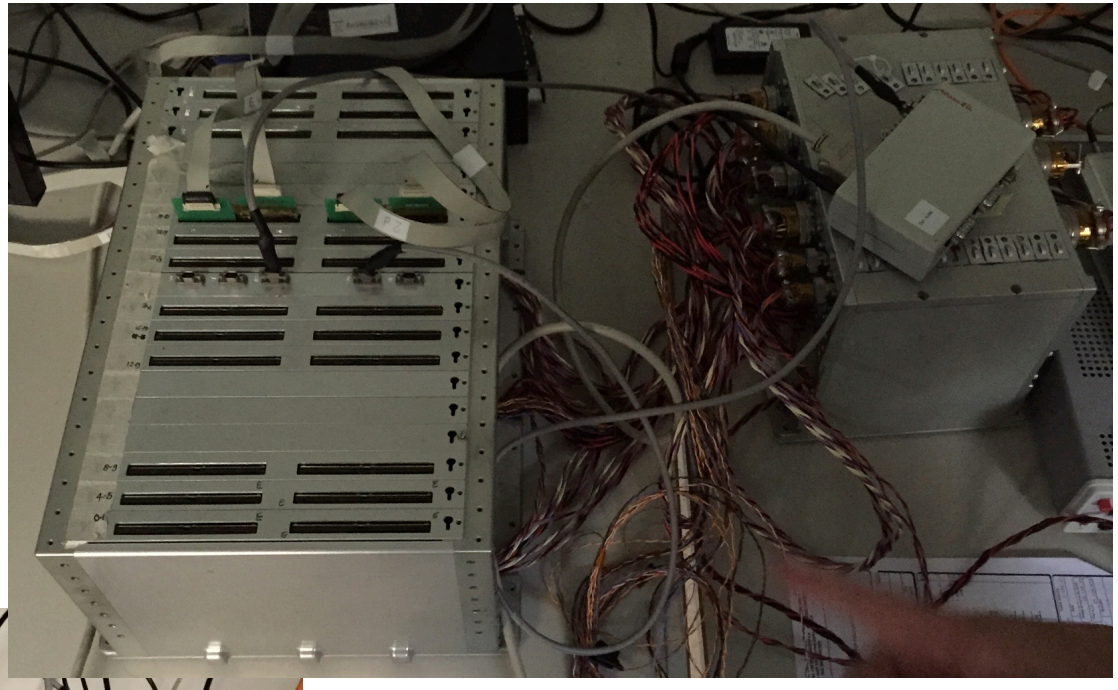
DAMPE TRB:

- up to 12 ladders
- up to ~ 300 hz
- busy management
- requires a custom port/driver
- cables crate-ladder ~50cm
- cables crate-PC ~50cm

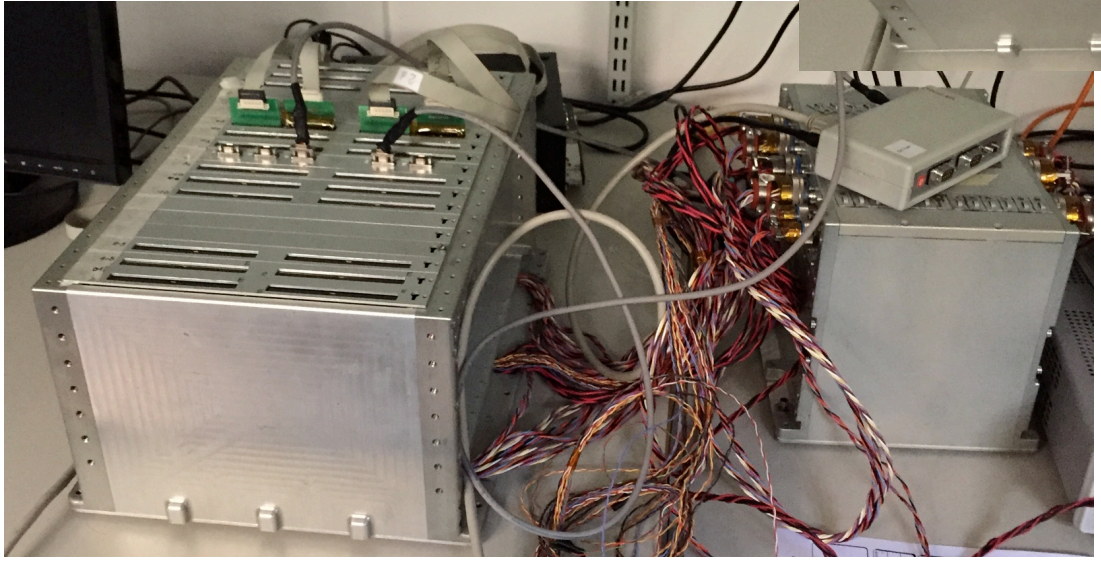


AMS TCrate, for AMS ladders:

- up to 24 ladders
- up to ~ 2 khz
- busy management
- requires a custom port/driver
- cables crate-ladder ~2m
- cables crate-PC up to ~7m



Reading the DAMPE ladders with this DAQ is technically possible but requires weeks of work (PCB boards with the HCC must be produced)



Electronics:

#	Type	# ladders	Max rate	Busy	PC	cables to ladder	cables to PC	Notes
2	AMS TCrate	24	2000 hz	Yes	Custom (2)	<2m	<7m	
3	mini-TRB	1	50 hz	No	Any	~ 50cm	<7m	
1	TRB	12	300 hz	Yes	Custom (1)	~ 50cm	~ 50 cm	

Ladder boxes:

- AMS ladders usually in PVC “transport” boxes (4 cm thick);

- DAMPE ladders in carbon fiber boxes (few cm thick) or in thin aluminum boxes