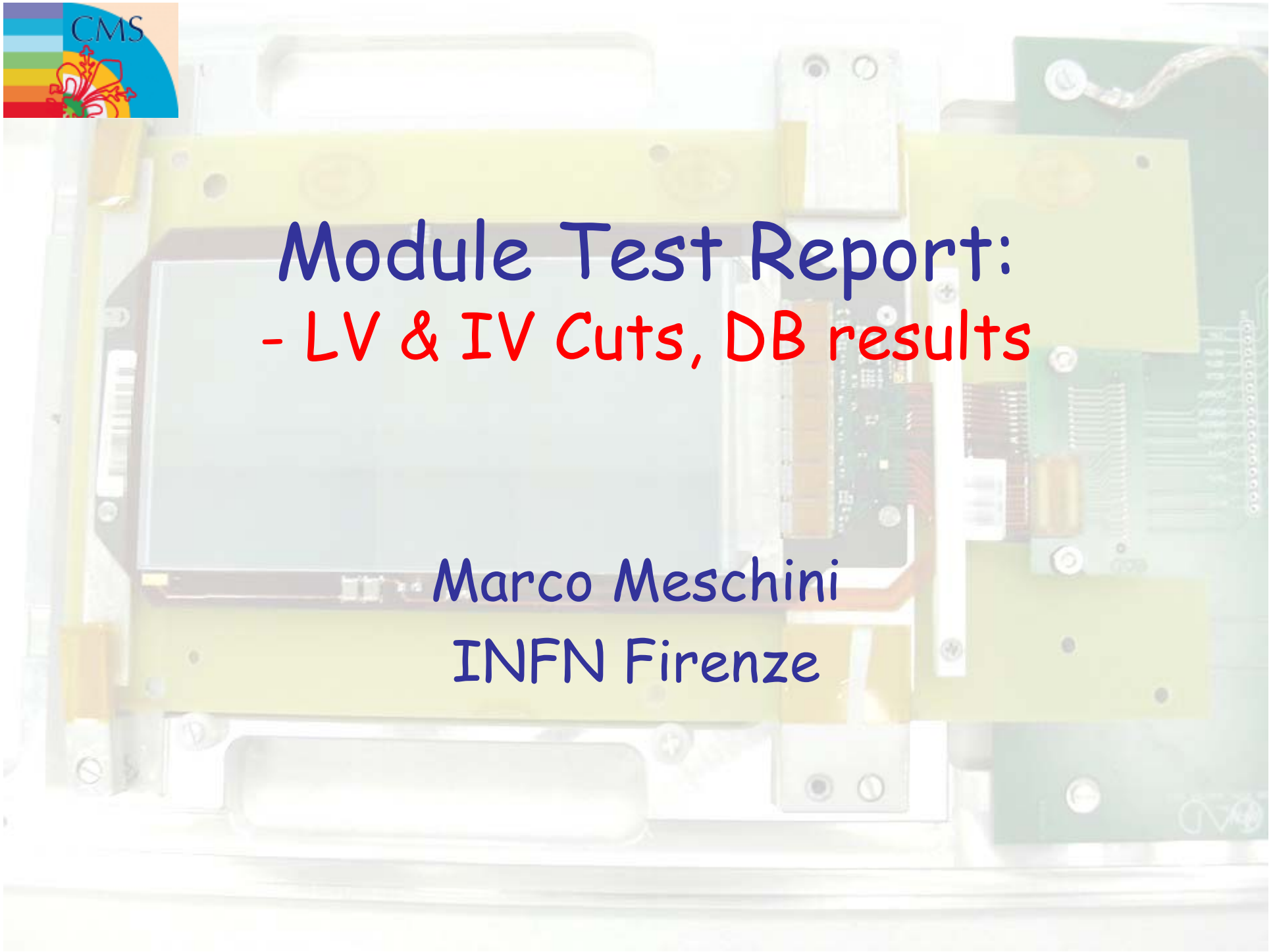


Module Test Report:
- LV & IV Cuts, DB results

Marco Meschini
INFN Firenze

The Situation from Module Test Webpage

Last Update: Marco Meschini meschini@fi.infn.it 28 June 2005

Module Test Monitor (Results from Tracker DB)

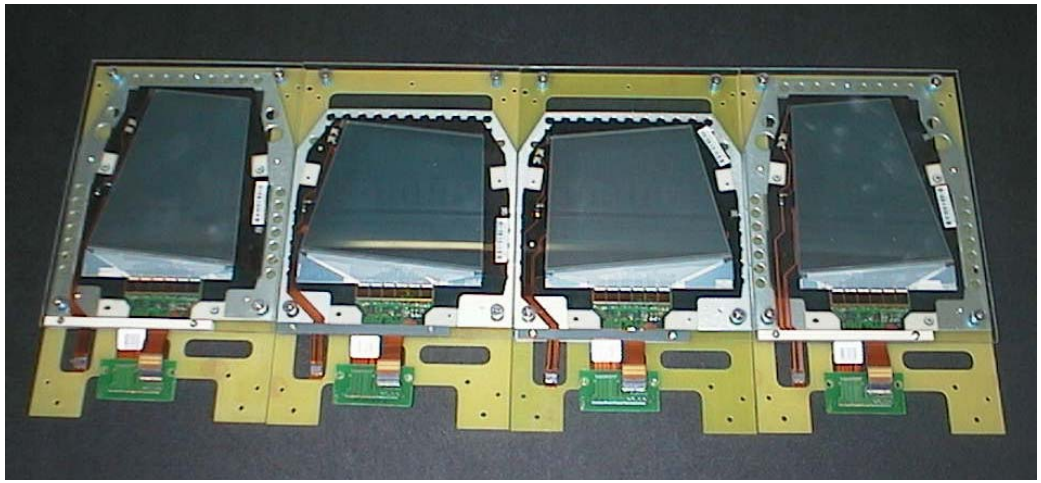
28 June 2005	TIB	TOB	TEC
ARC Tested Modules	1840	1735	1481
Good Modules	1819	1728	1447
Bad Modules	21	7	34
Bad Strip % on Good Modules	0,09	0,09	0,14
LT Tested Modules	1796	1535	537
Good Modules	1793	1527	531
Bad Modules	3	8	6

Plots on Module Tests

- Module Test Results
- Module Test Meetings

Links

TID Modules produced so far (06Jul05)



- Tested ARC

	PD	PI	TO	Tot
TID1 rϕ				/
TID1 SF		21	18	39
TID1 SB		18	17	35
TID2 rϕ				/
TID2 SF		20	11	31
TID2 SB		18	16	34
TID3 rϕ	18	5		23

Analysis shown not based on the full sample

- 1 TID1 module in TO rejected at the arrival because of high LV current
- 1 TID2 module in PI with high IV (?)

Proposed TID cuts for ARC

NoiseCuts (ADC)		PHL	OSO	NOIS
Pk	Ring 1	0.50	0.95	1.45
	Ring 2	0.50	0.85	1.35
	Ring 3	0.50	0.95	1.45
Dec	Ring 1	0.70	1.35	2.05
	Ring 2	0.70	1.25	1.90
	Ring 3	0.70	1.35	2.05

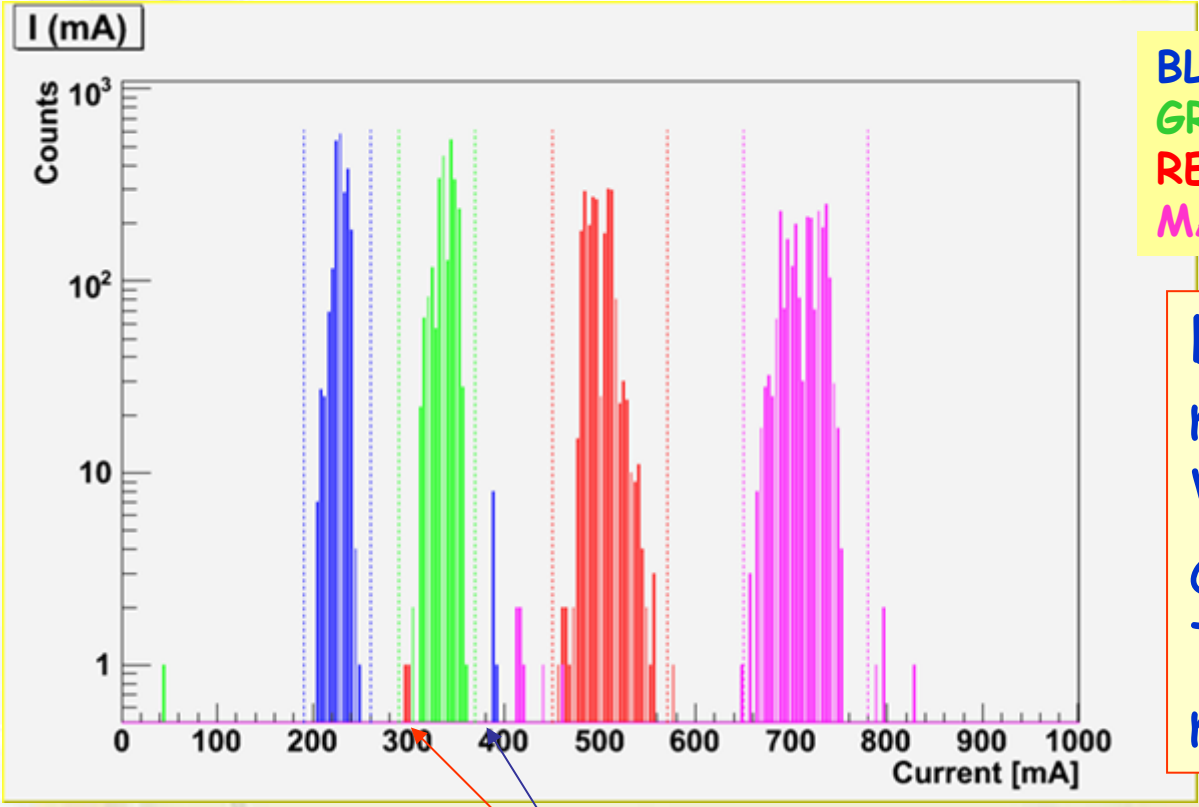
Cuts ready for LT too
Will be on Module Test web page next week

Cooling efficiency for LT checked and satisfactory

- Same cuts for Ring 1 and Ring 3
  (cf. L_{strip}=110.8 μm vs. L_{strip}=110.6 μm while p=82-112 μm p=123-158 μm)
- Different from TEC Ring 1 (L_{strip}=85.1 μm)

NoiseCuts (ADC)		PHL	OSO	NOIS
Pk	TEC Ring 1	0.55	0.79	1.31
Dec	TEC Ring 1	0.80	1.10	1.74

Low Voltage Currents (TOB+TIB+TEC)



BLUE = 1.25 V (4 APVs)
GREEN = 1.25 V (6 APVs)
RED = 2.50 V (4 APVs)
MAGENTA = 2.50 V (6 APVs)

Distribution from all modules in DB: Vertical bars cuts can be applied to TOB and TEC modules as well

Examples of un-physical values?

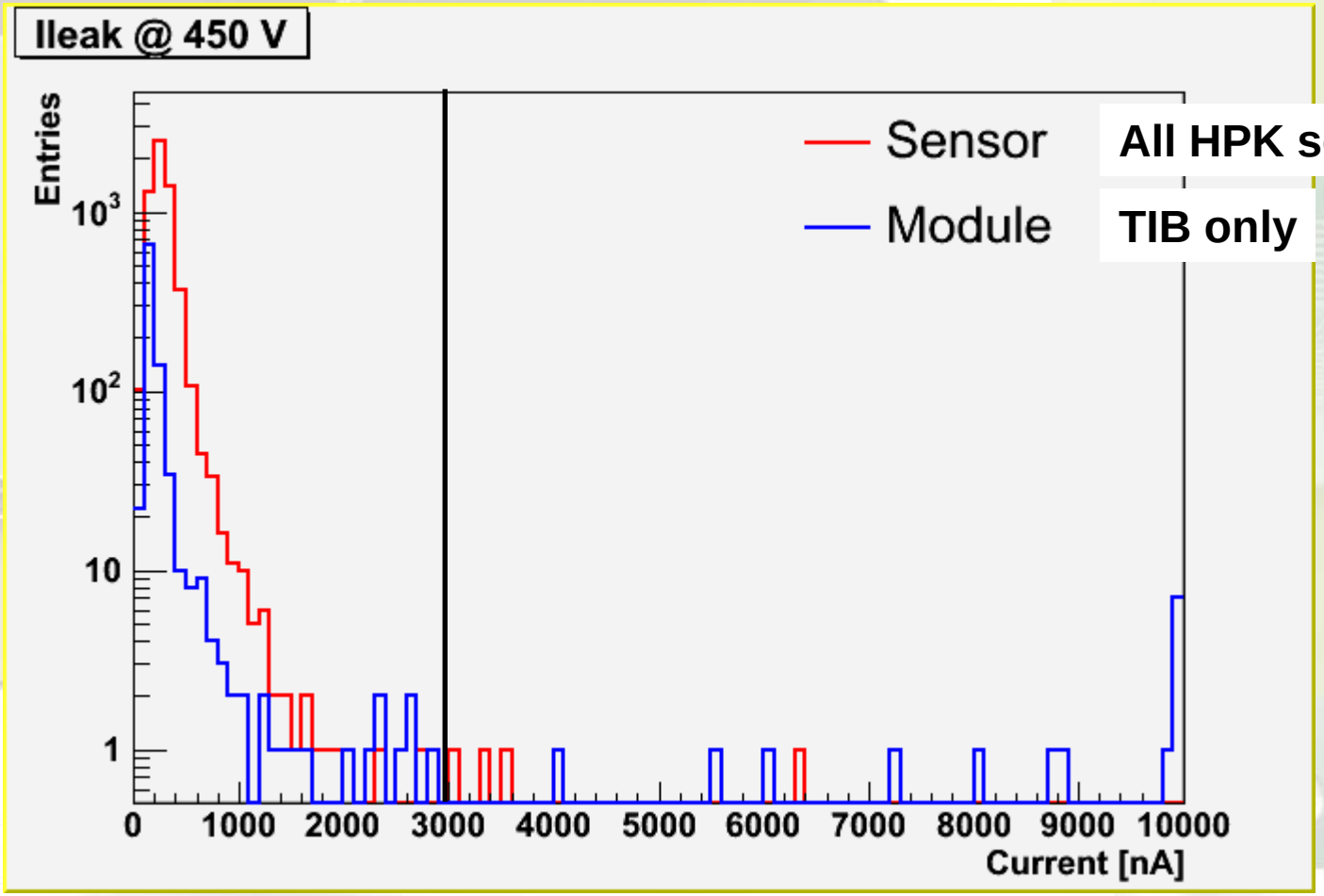
4 chips:
0.19 A < I125 < 0.26 A
0.45 A < I250 < 0.57 A
6 chips:
0.29 A < I125 < 0.37 A
0.65 A < I250 < 0.78 A

Cuts adopted in TIB (since ARC 8.0)

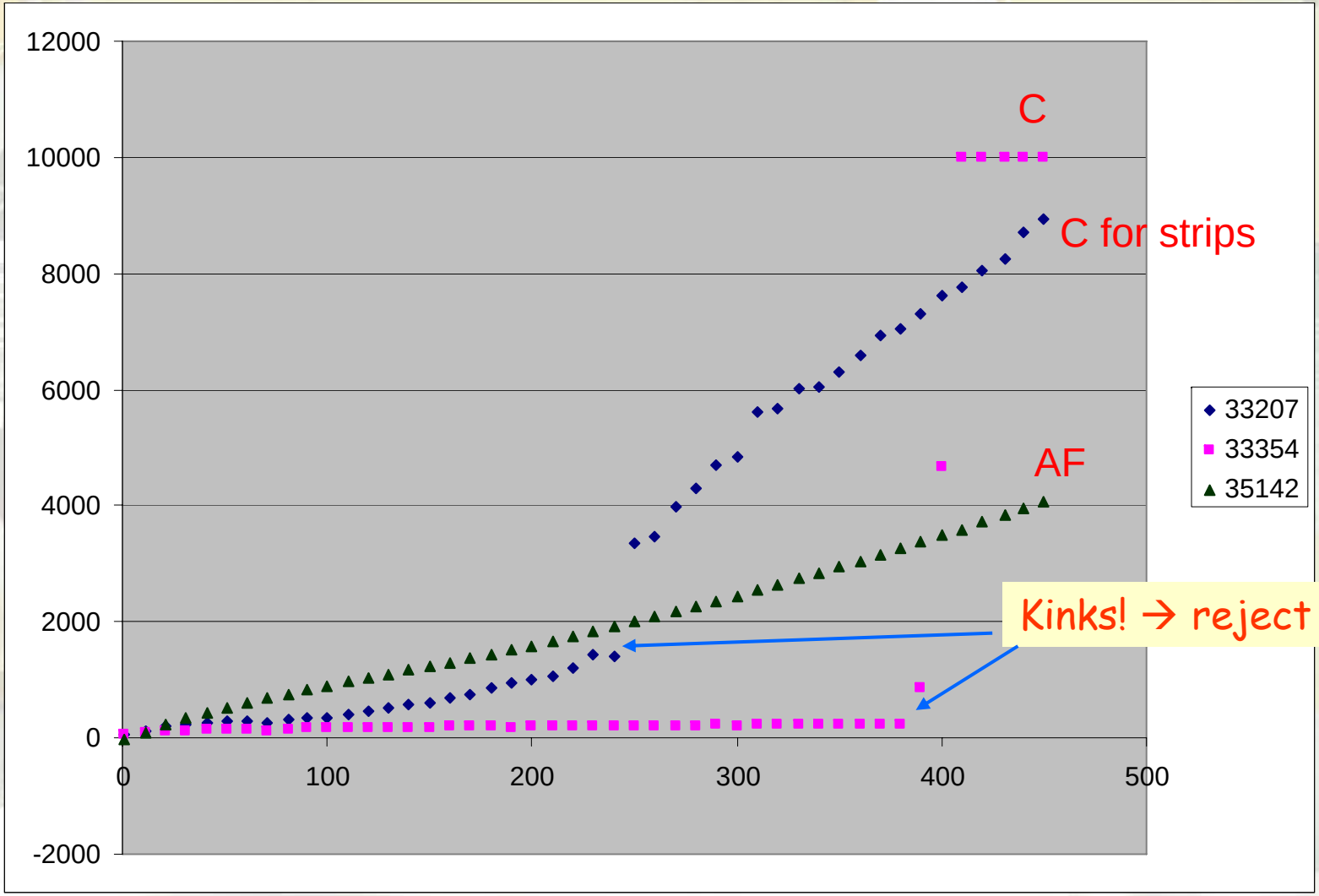
Cuts to be circulated among modtest L3 for final agreement

Ileak for HPK Sensors & Modules

Last update May 20, 2005



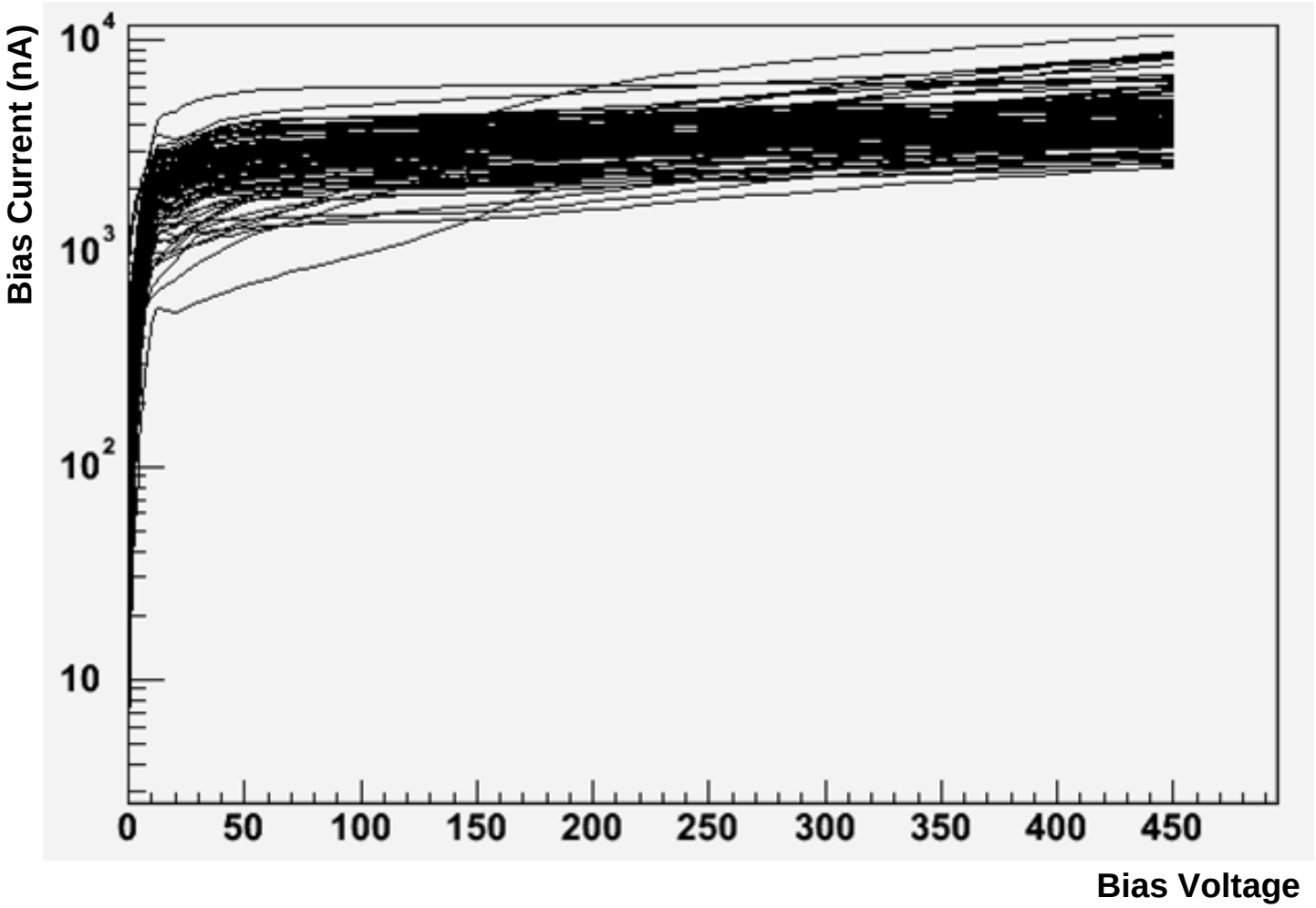
Example of TIB Critical IVs (<10 μA)



TIB strategy accepted by TOB & TEC

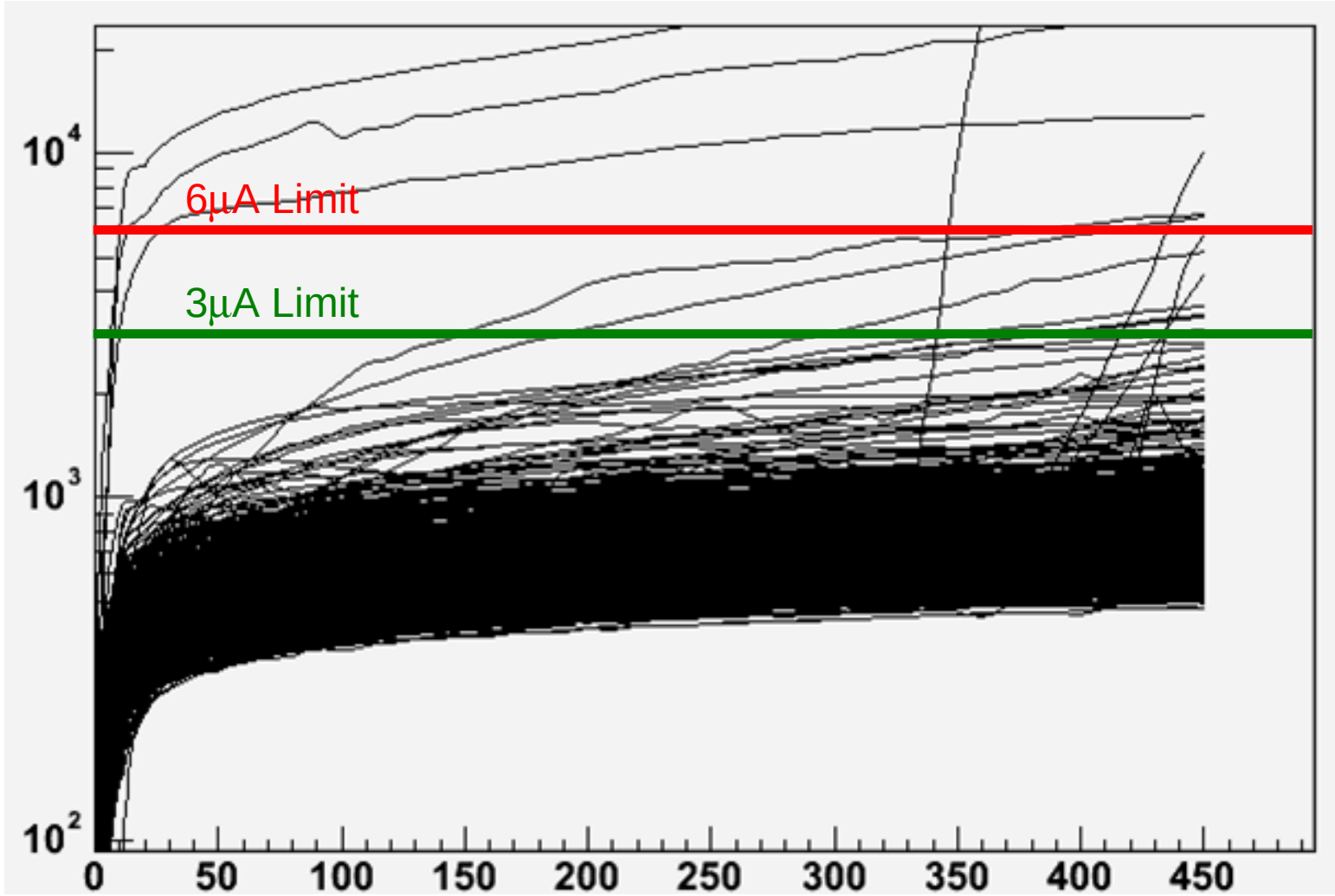
- The new strategy for HPK modules is:
  - Remove the cut 5 x Isens
  - Compensate in xFLAG I(@450 V) wrt the temperature:
    - Rescale Ileak measured in ARC test to a temperature of 23°C
    - > 3 μA → grade F
      - Must be checked by hand (should be a small number of modules!)
    - > 10 μA → grade C
    - Local L3 should check and Accept/Reject modules

US ST Production Modules



All 98 ST modules would pass either requirement

US HPK Production Modules



L3 Intervention Requirement

Of the 1973 HPK modules, the following would fail the proposed requirements

	FNAL	UCSB	Total
>3 μA	5	10	15
>6 μA	2	5	7

Most of the modules that would require intervention either had a pulled pinhole or a noisy channel

1.3% or 0.6% of the modules would require L3 intervention for the two proposed requirements

- 1 every 2.5 or 5 days at peak rate per site

US Conclusions

No surprises seen in either ST or HPK modules

Requiring L3 intervention on modules with >6 μA bias current is a good idea and will not be a burden

The 5x requirement does not find any truly bad modules and fails good ones

- We agree with Marco that this requirement should not be applied

Module Test – I(450)

Grade C – I(450) above 10 µA per Sensor

faulty TEC modules with 1 Sensor: 3

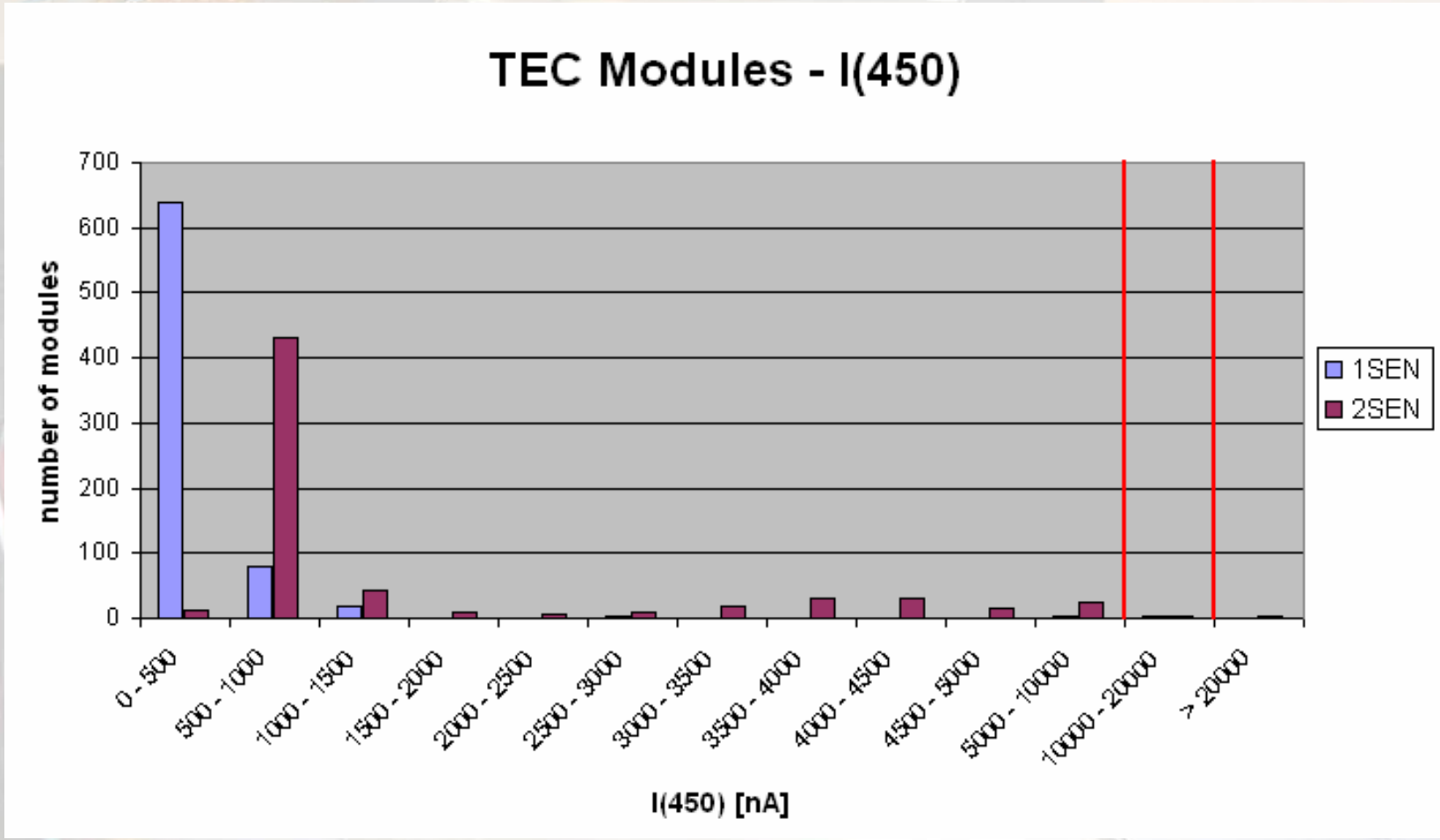
faulty TEC modules with 2 Sensors: 2

(both 2-sensor-modules contain HPK-Sensors)

Module ID	# of Sensors	I(450) [nA]	where tested
30200020026874	1	11425	ZURICH-ETH
30200020028651	1	13075	ZURICH-ETH
30200020028927	2	50200	AACHEN-REPAIR
30200020020541	2	35500	SANTA-BARBARA

According to Database flag 5 modules faulty (missing was tested in Karlsruhe)

Module Test – I(450)



Conclusions

- New 3 μA (I@450V) threshold for grade F modules accepted for HPK modules; ST modules stay 2x10μA
- Some problems are hidden inside data uploaded into central tracker DB:
  - LV current (see previous plot)
  - HV leakage current: take as example a TEC module presented today, bad for IV, I@450V=11425nA (Faulty!) BUT from DB I@450V=1142.5nA (Qualified!)

Numbers of faulty modules from different sources do not always match with DB content: more care is needed on uploaded data (units, “false” bad channels etc.)