Status of electrical test apparatus for endcap feedthrough construction at the University of Victoria

Marseilles 10/99

Paul Poffenberger
University of Victoria

overview of production electrical tests

- **vacuum cables**
  - cross talk
  - precision resistance
  - ground contact resistance
  - impedance
- **pigtail cables**
  - cross talk *calibration cables*
  - continuity and cross wiring

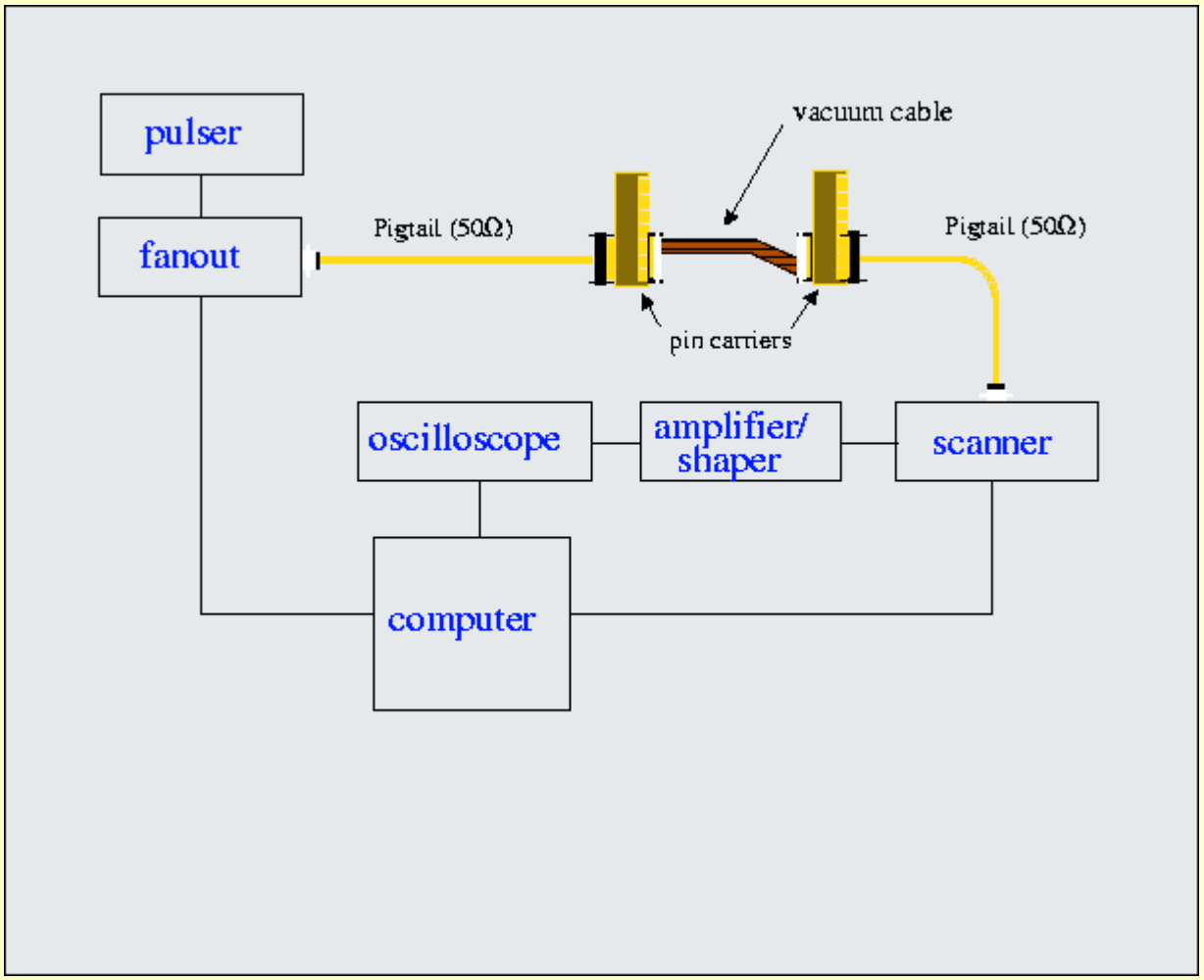
Marseilles 10/99

Paul Poffenberger
University of Victoria

- **before assembly welds**
  - continuity
- **cold tests**
  - continuity
  - cross talk
- **final electrical tests**
  - precision resistance
  - cross talk

Paul Poffenberger
University of Victoria

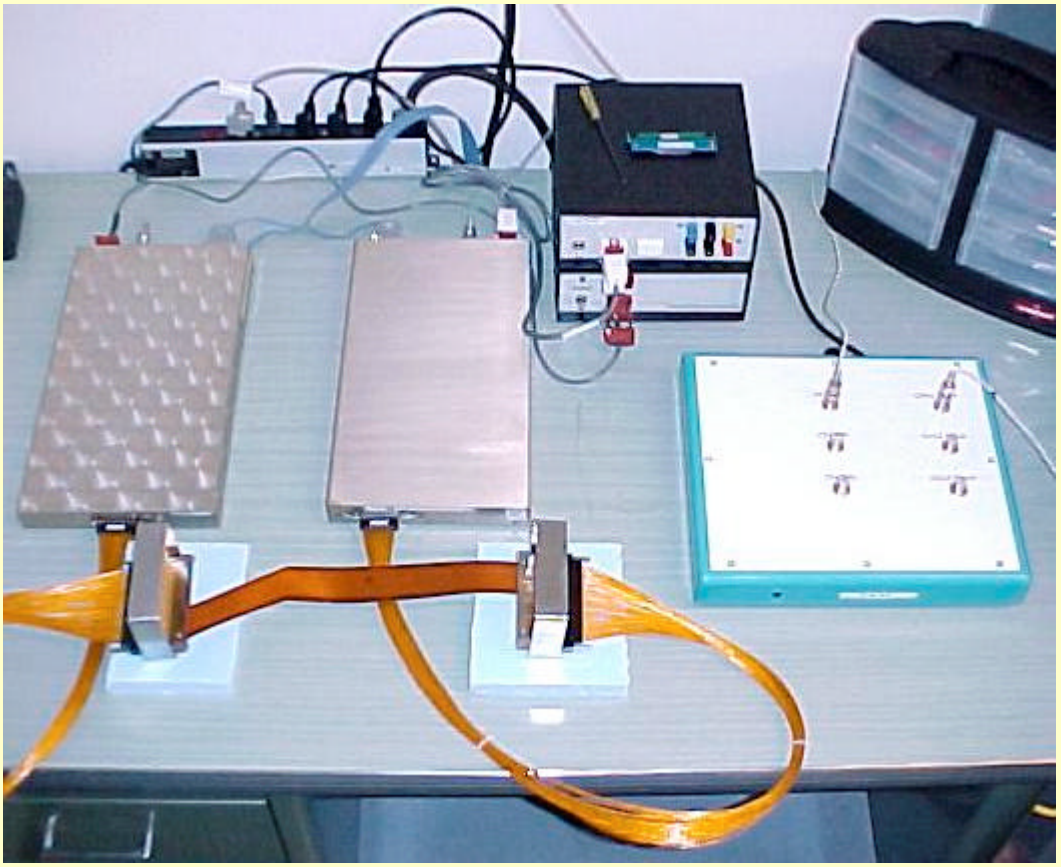
Cross talk test apparatus



Marseilles 10/99

Paul Poffenberger
University of Victoria

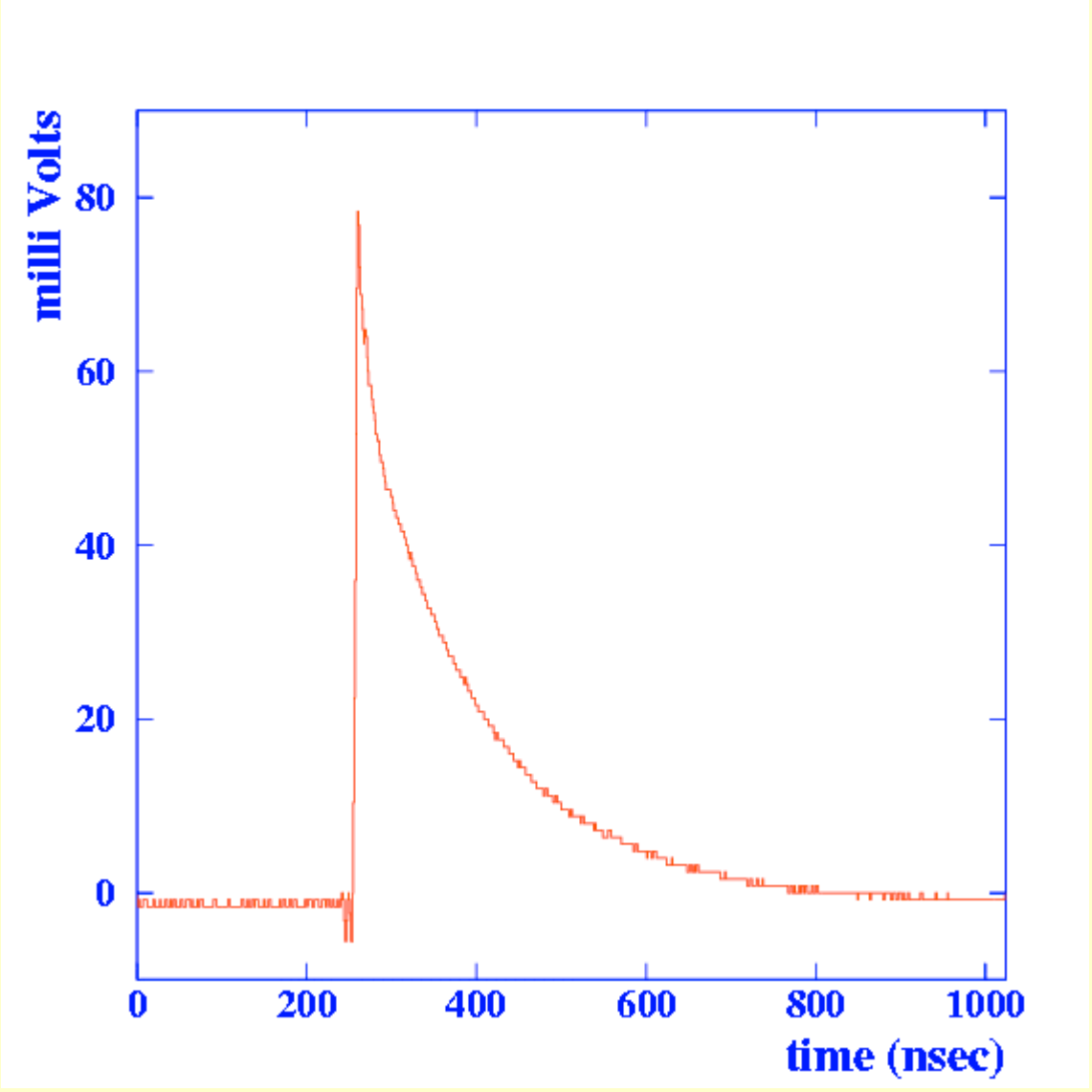
fanout and scanner
for cross talk measurements



Marseilles 10/99

Paul Poffenberger
University of Victoria

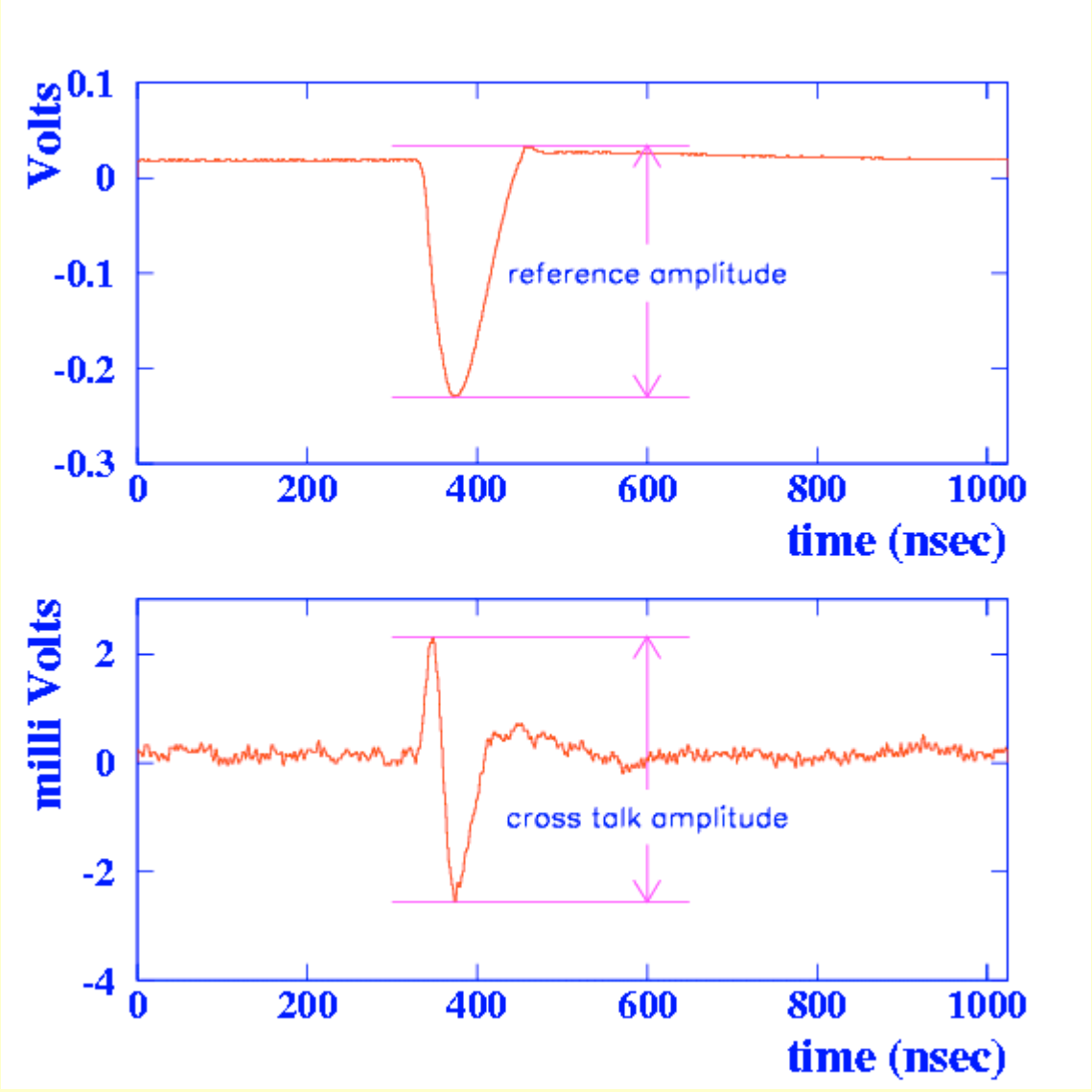
pulser signal injected into cables for cross talk tests



Marseilles 10/99

Paul Poffenberger
University of Victoria

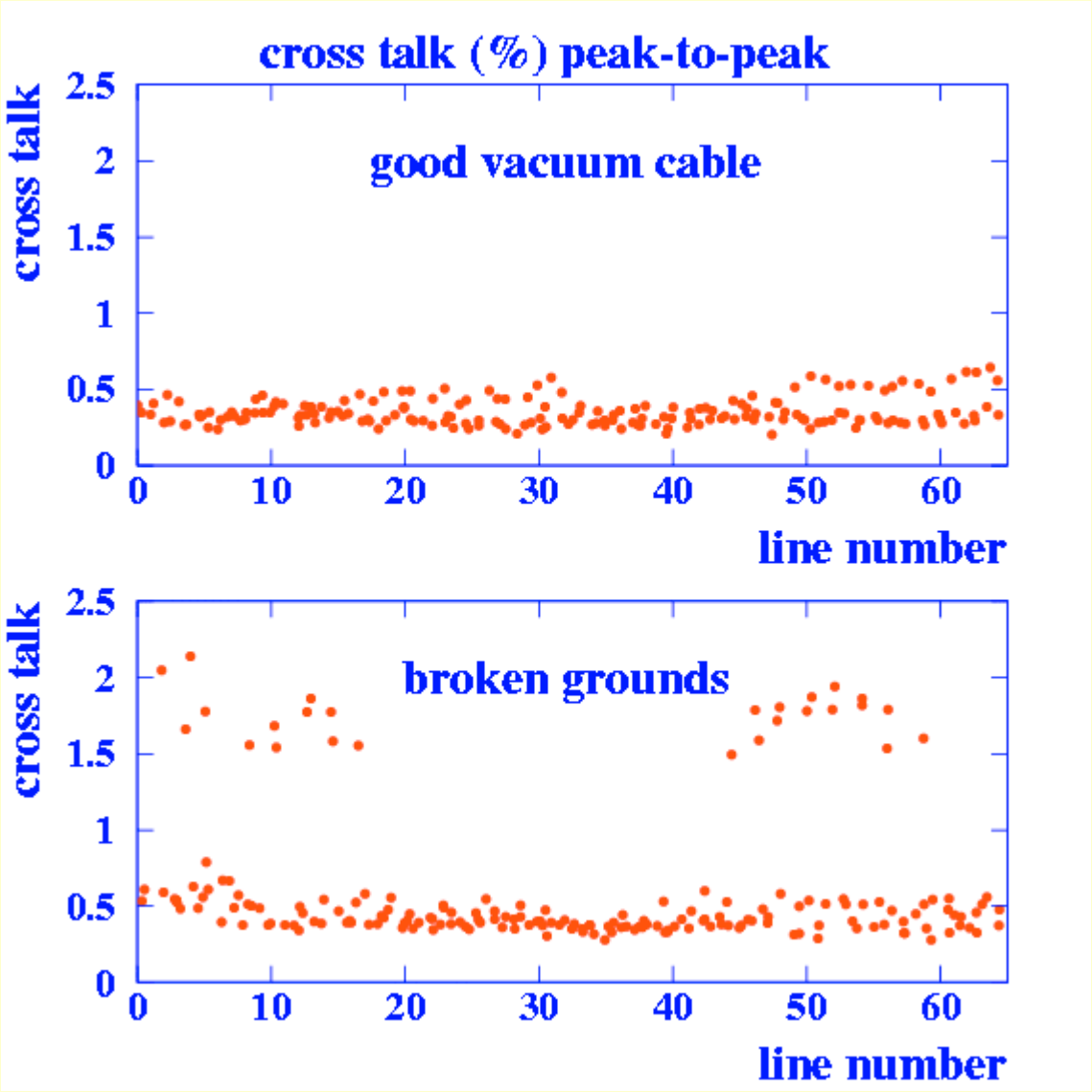
peak-to-peak cross talk measured on cable with broken ground traces



Marseilles 10/99

Paul Poffenberger
University of Victoria

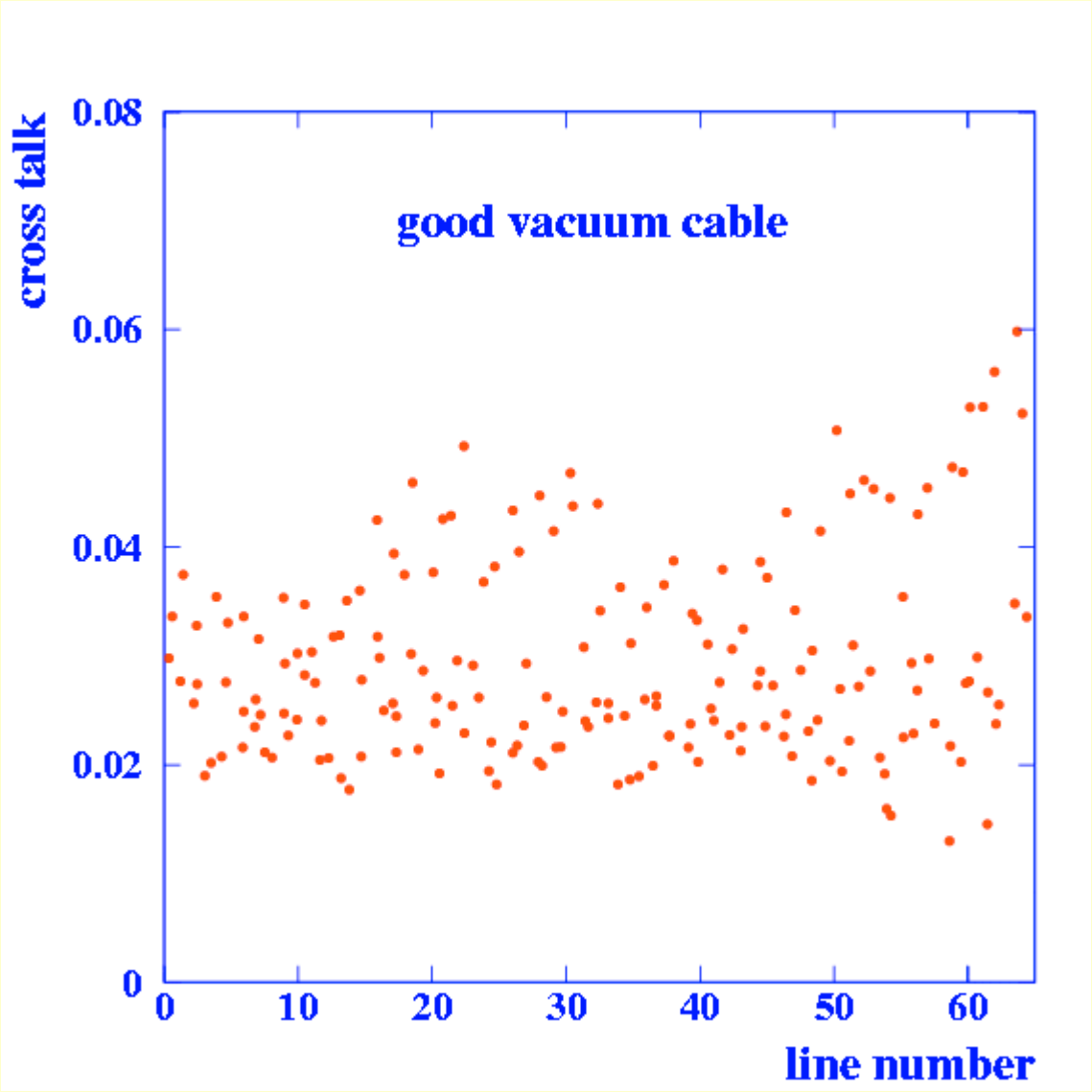
broken ground traces easily identified by enhanced cross talk



Marseilles 10/99

Paul Poffenberger
University of Victoria

integrated cross talk (%) at the peak

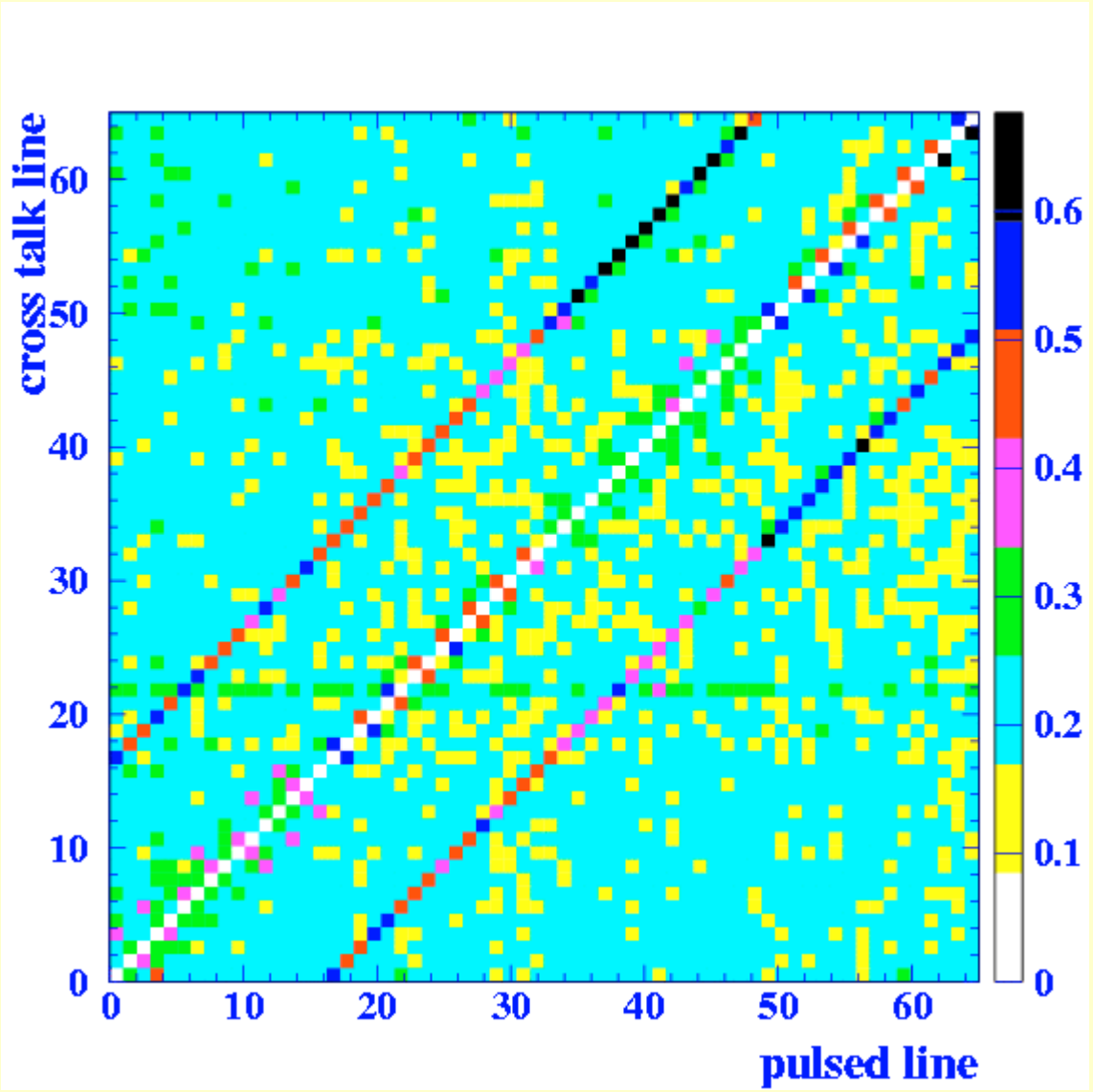


Marseilles 10/99

Paul Poffenberger
University of Victoria

pigtail cross talk (%) peak-to-peak

measure full 64 x 64 matrix
μD nearest neighbors are evident

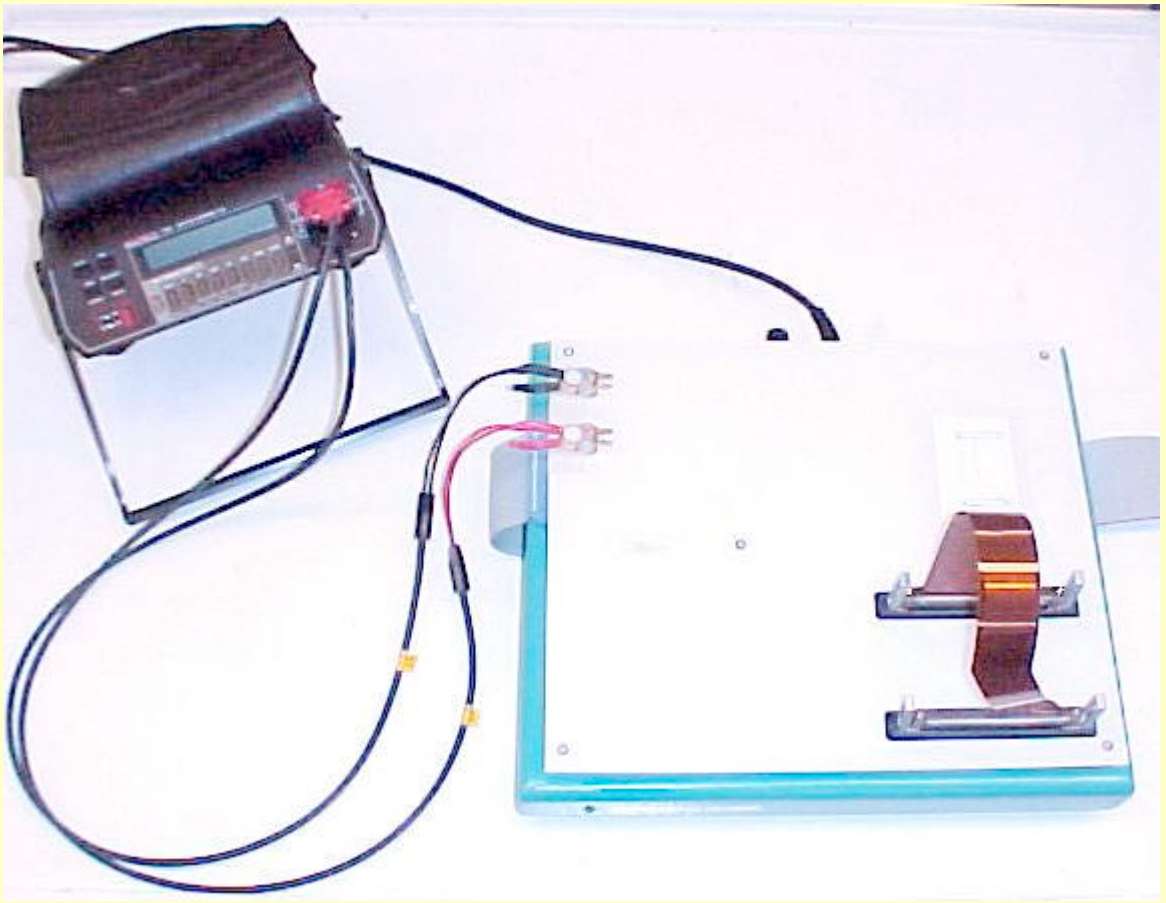


Marseilles 10/99

Paul Poffenberger
University of Victoria

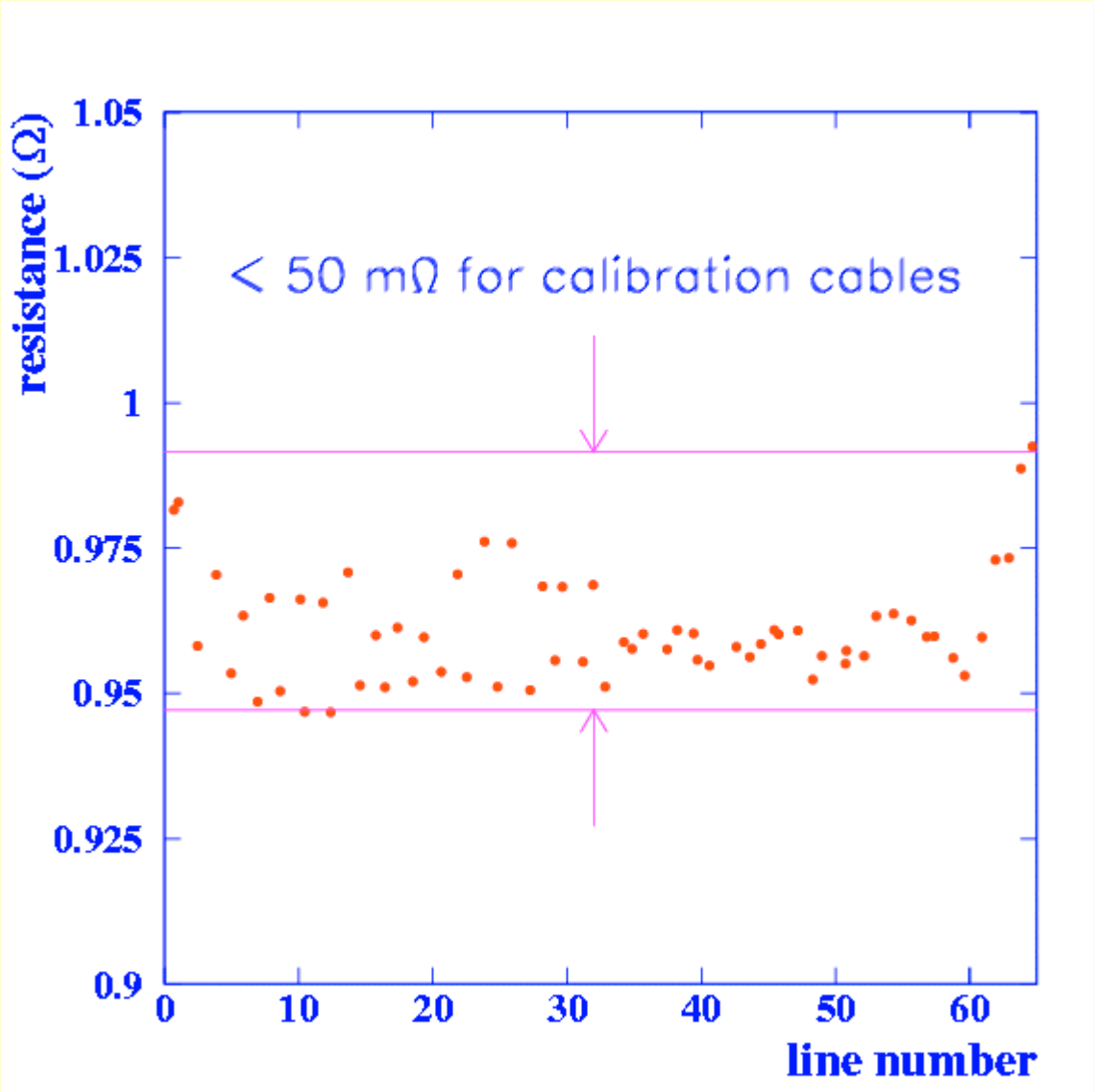
precision resistance measurements

~10 cables per hour



Marseilles 10/99

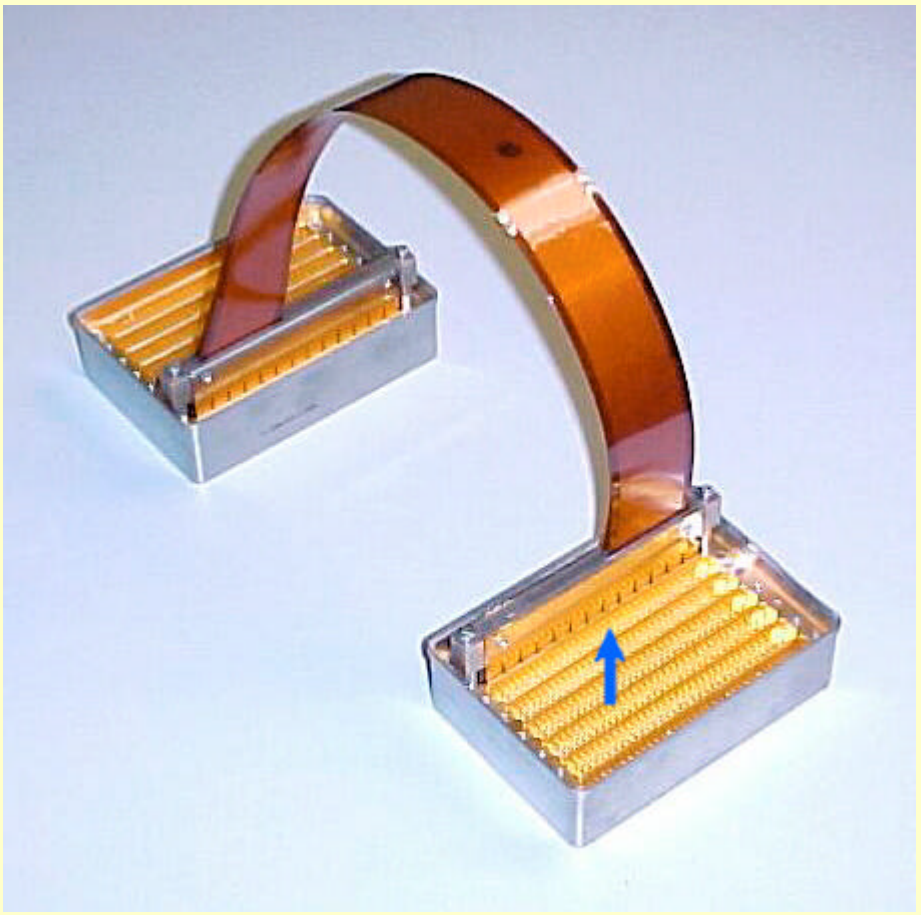
Paul Poffenberger
University of Victoria



Marseilles 10/99

Paul Poffenberger
University of Victoria

ground contact resistance for vacuum cables

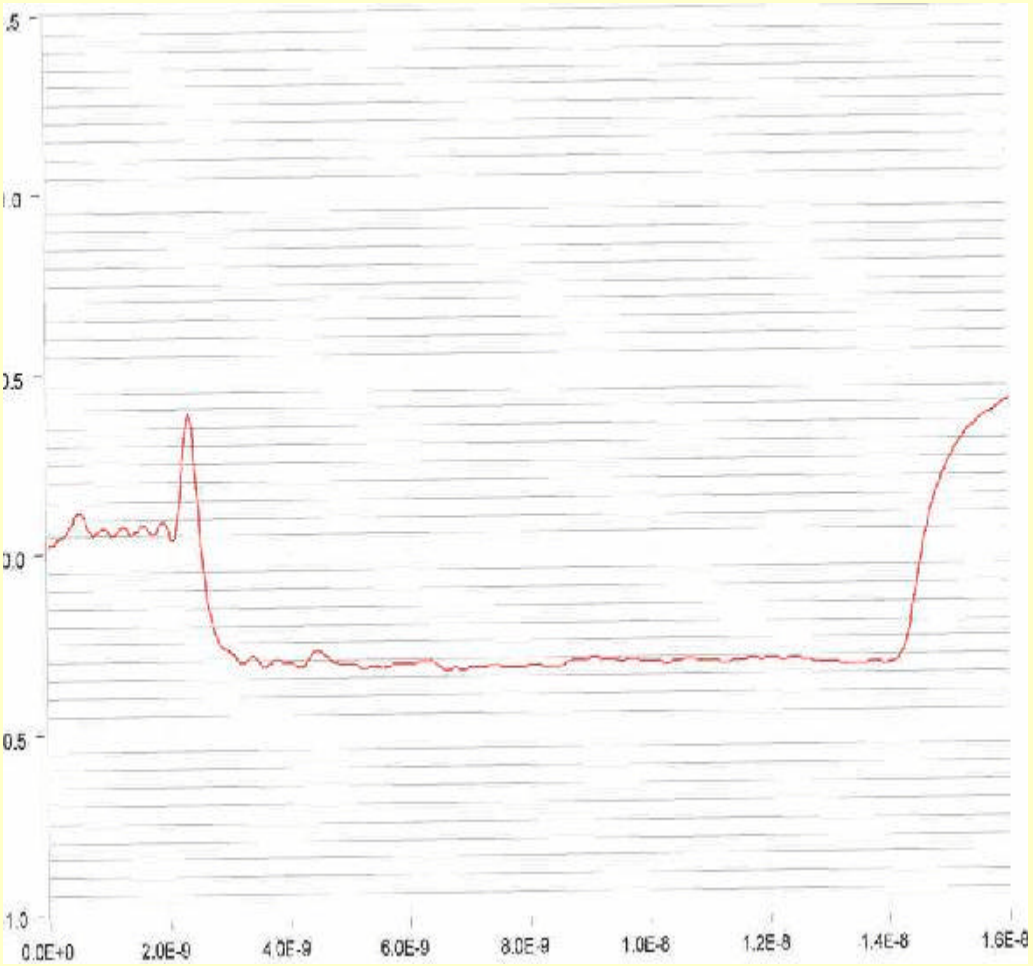


test apparatus complete in November

Marseilles 10/99

Paul Poffenberger
University of Victoria

impedance measurements for vacuum cables

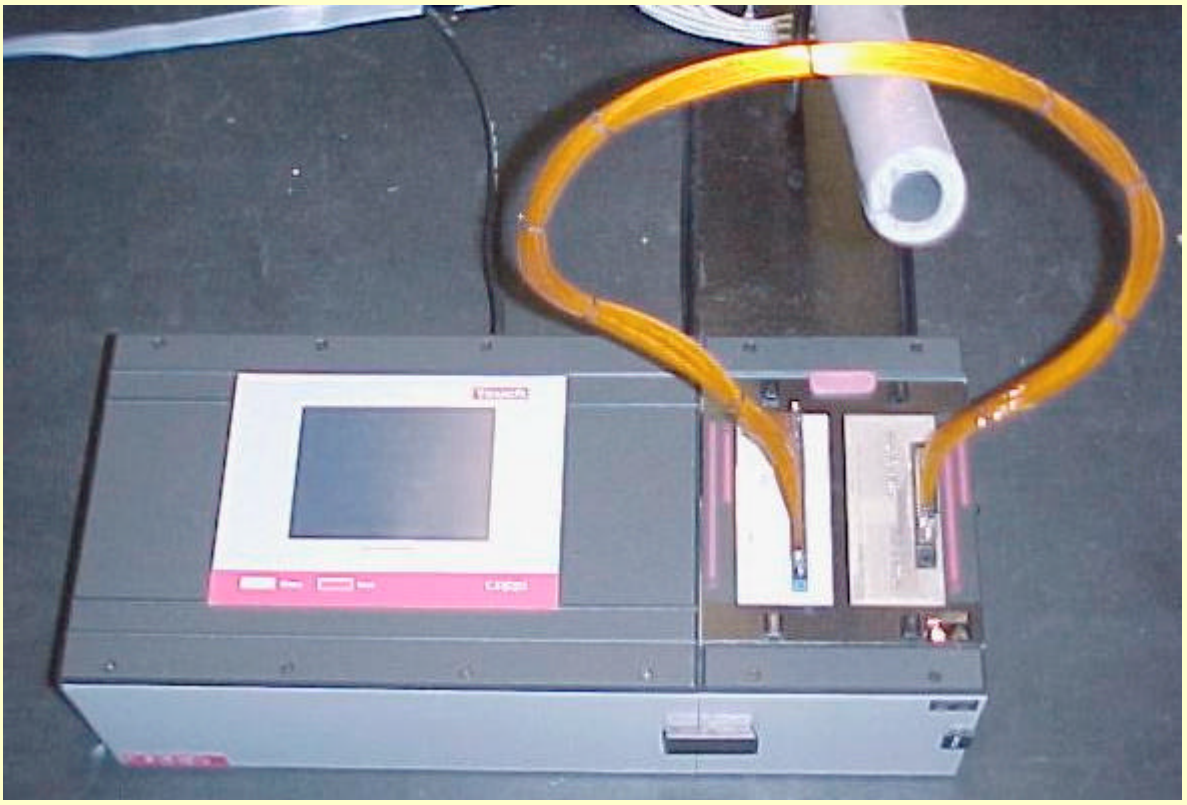


test apparatus complete in December

Marseilles 10/99

Paul Poffenberger
University of Victoria

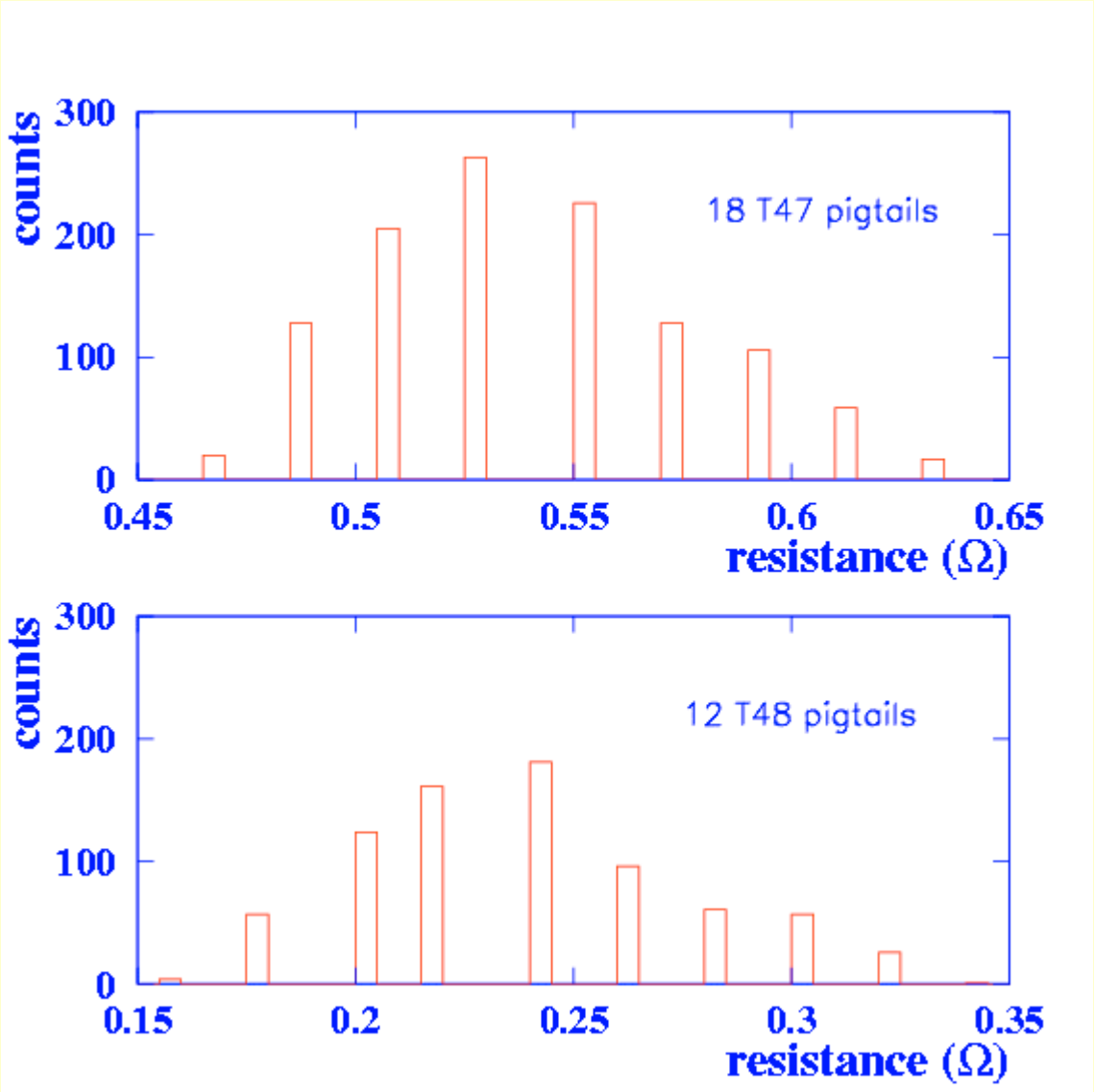
signal continuity and cross wiring of pigtails checked with cirris cable tester



Marseilles 10/99

Paul Poffenberger
University of Victoria

resistance histograms of T47 and T48 pigtails measured with cirris cable tester



Marseilles 10/99

Paul Poffenberger
University of Victoria

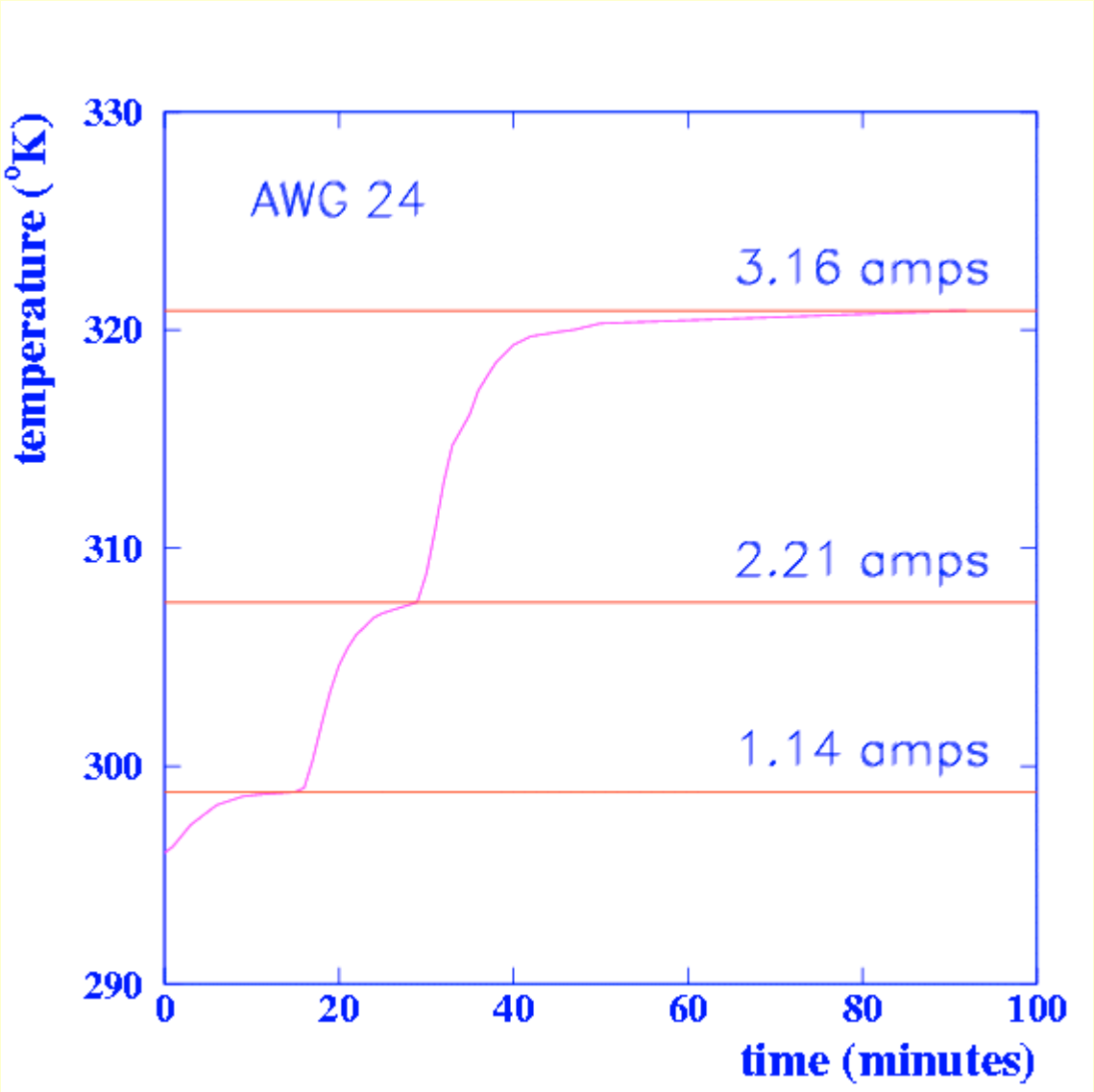
HEC low voltage vacuum cable tests

- wire temperature vs current in feedthrough under vacuum
- induced noise on signal cables from hypothetical noisy power supply

Marseilles 10/99

Paul Poffenberger
University of Victoria

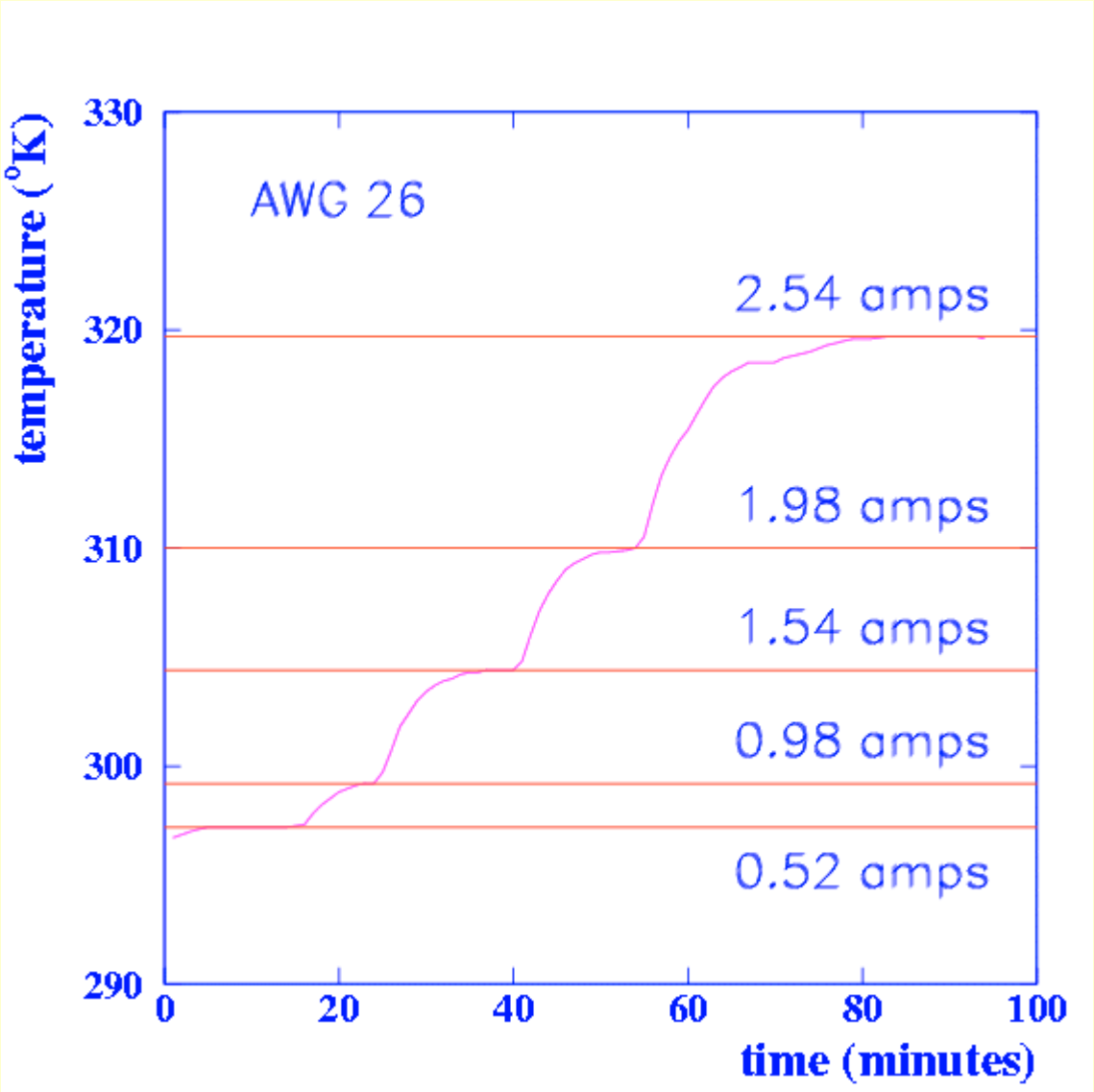
AWG 24
nominal current 900 mA



Marseilles 10/99

Paul Poffenberger
University of Victoria

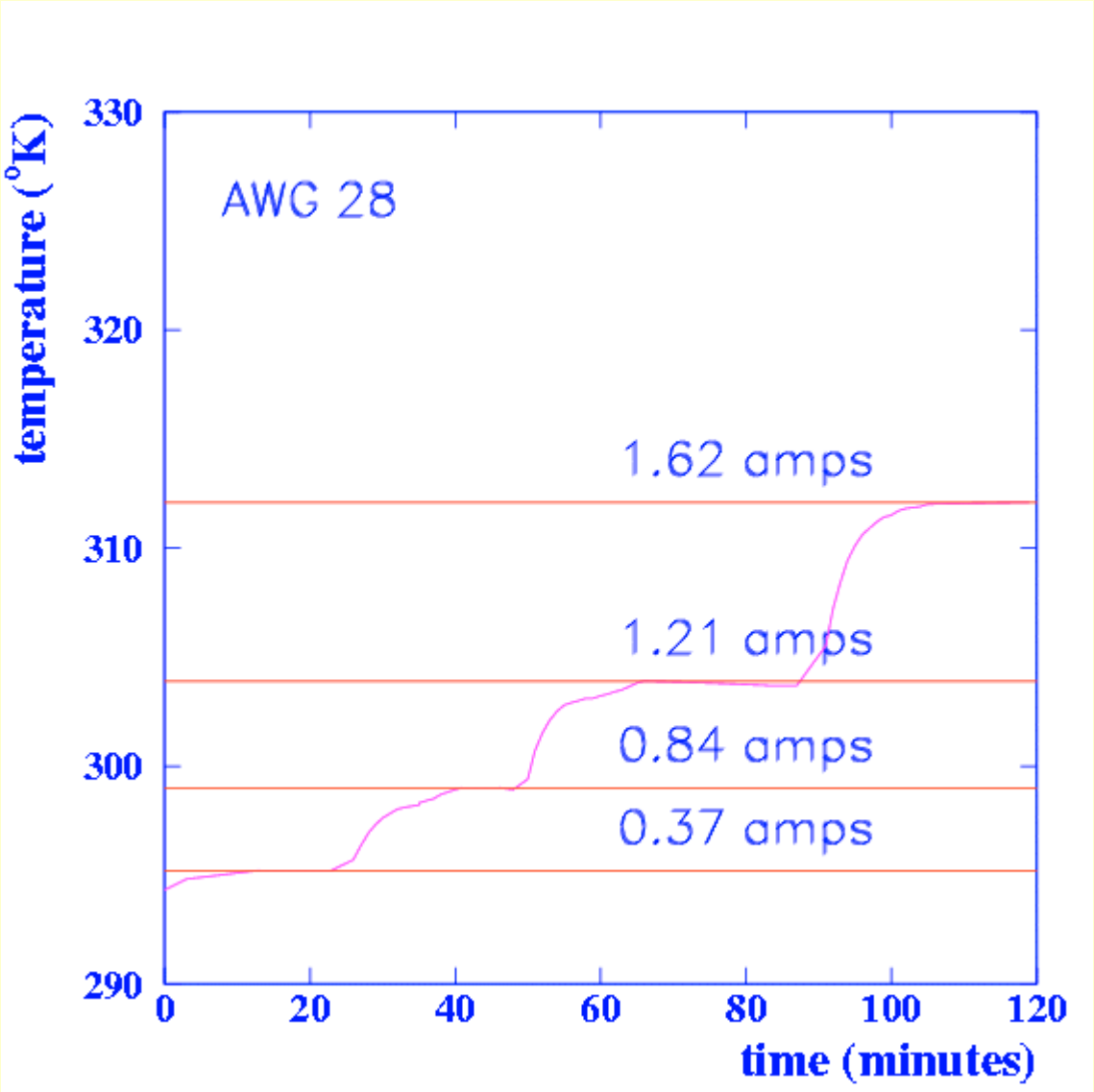
AWG 26
nominal current 550 mA



Marseilles 10/99

Paul Poffenberger
University of Victoria

AWG 28
nominal current 400 mA

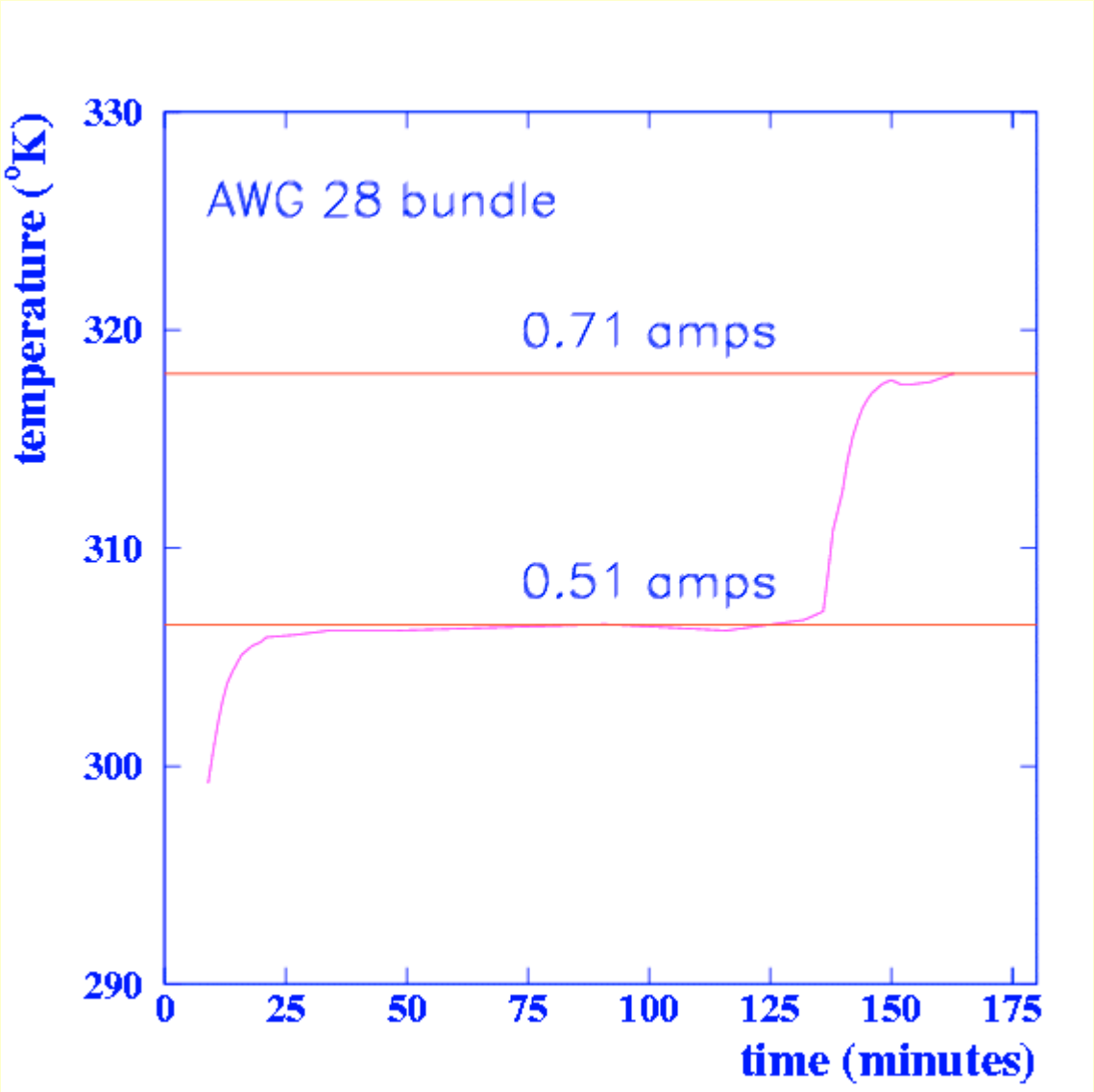


Marseilles 10/99

Paul Poffenberger
University of Victoria

AWG 28

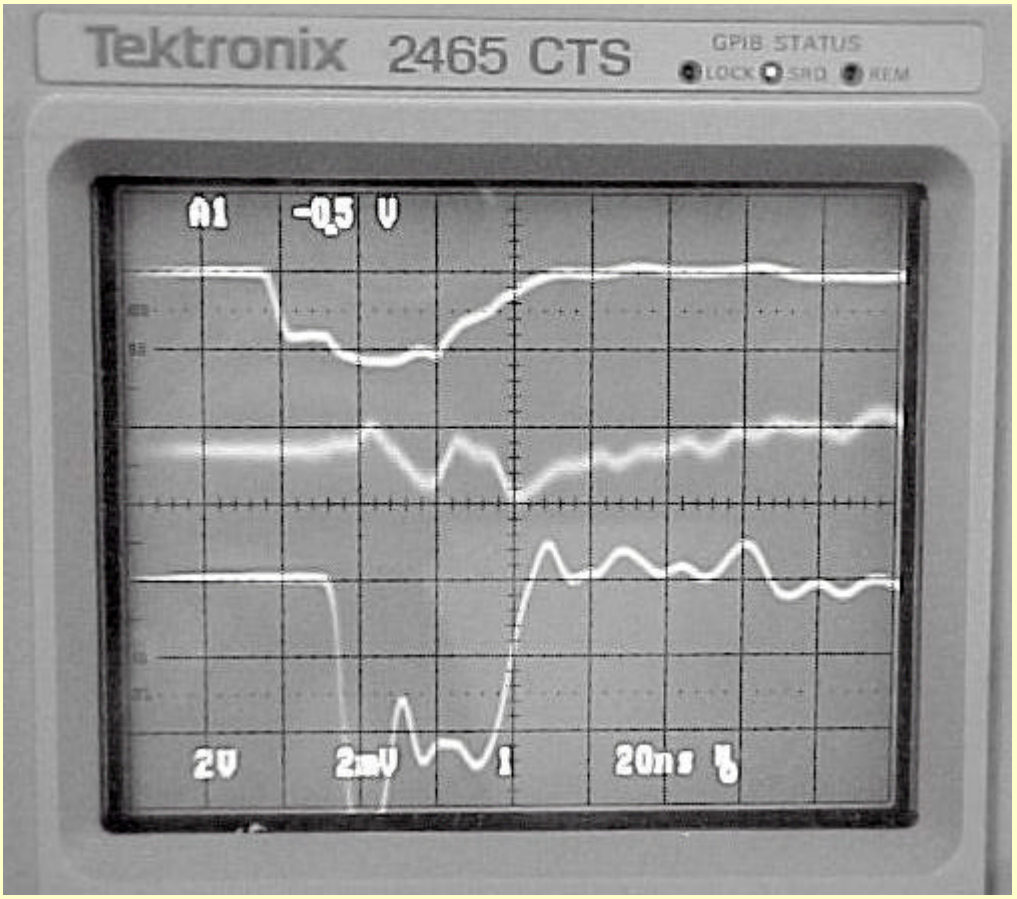
28 current carrying wires bundled together



Marseilles 10/99

Paul Poffenberger
University of Victoria

induced noise from signal on HEC low voltage cable



top and bottom traces:
pulser input to LV cable
middle trace:
induced noise on signal cable

Marseilles 10/99

Paul Poffenberger
University of Victoria

- Ripple on the HEC low voltage power cables induce noise on neighboring signal cables at the ~0.1% level.
- The ripple on the HEC low voltage power cables *might* be ~500 mV, leading to a signal noise amplitude of ~500μV.
- **Is this tolerable for the EM calibration lines???**

Paul Poffenberger
University of Victoria