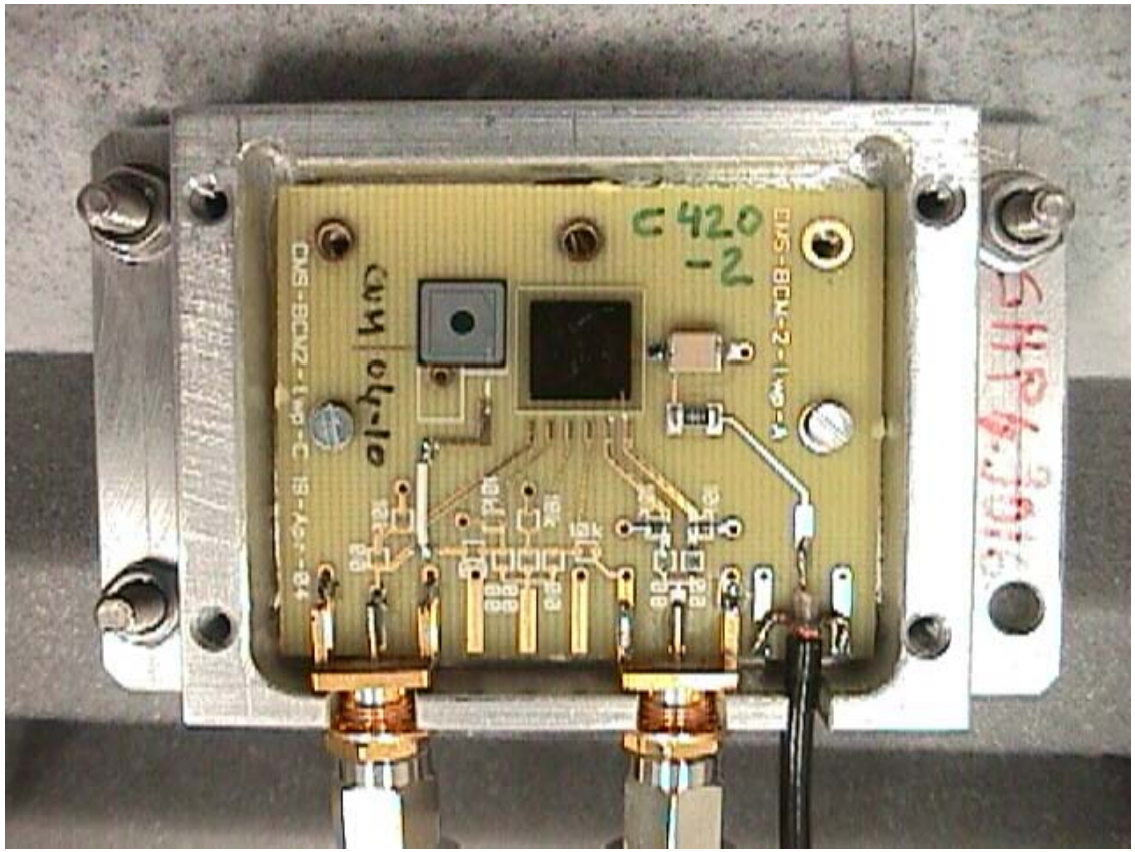
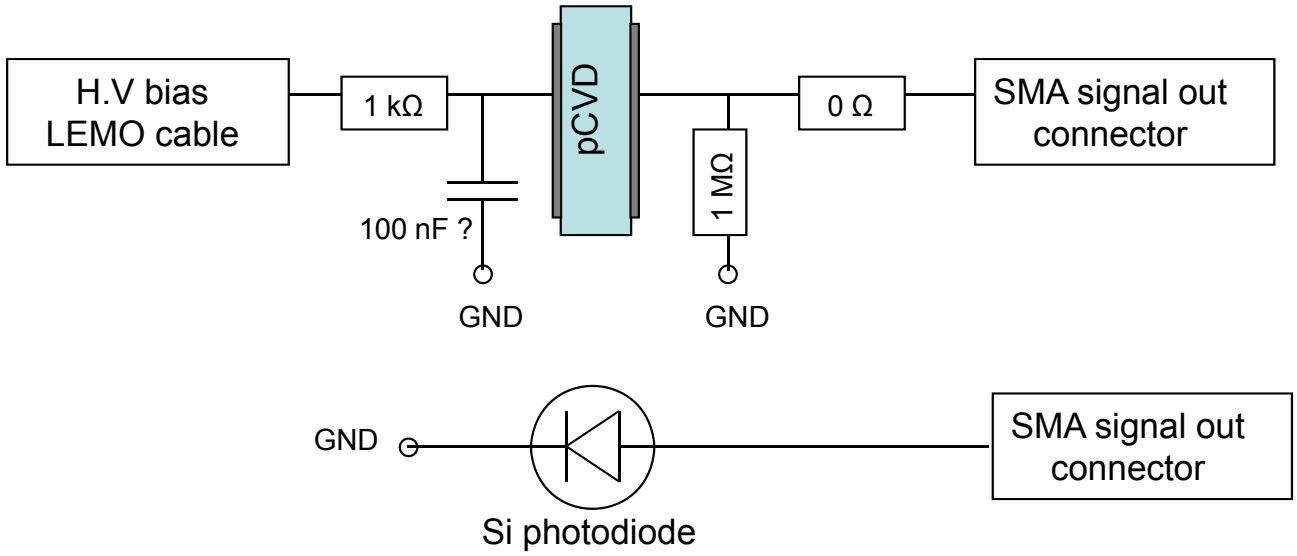


Si photodiode output pCVD output

re-constructed
circuit diagram



Present channel configuration

Detector	Osc. Channel	Sampling Speed [MS/s]	Power Supply CH	Voltage [V]	Attenuation [dB] (no Hg)
pCVD I	LeCroy, CH1	2500	PS3, CH1	500	20
pCVD II	-	-	-	-	-
pCVD III	LeCroy, CH2	2500	PS3, CH2	500	20
pCVD IV	-	-	-	-	-
pCVD V	LeCroy, CH3	2500	PS3, CH3	500	30
pCVD VI	LeCroy, CH4	2500	PS3, CH4	500	30
ACEM I	TEK, CH1	500	PS2, CH1	?	0
ACEM II	TEK, CH2	500	PS2, CH2	?	0
ACEM III	TEK, CH3(*)	500	PS2, CH3	?	0
ACEM IV	TEK, CH4	500	PS2, CH4	?	0
PIN <i>	-	-	-	60	-

- (*) Malfunctioning of the Tektronix restricts the voltage resolution on this channel to be at least 300 mV/div.

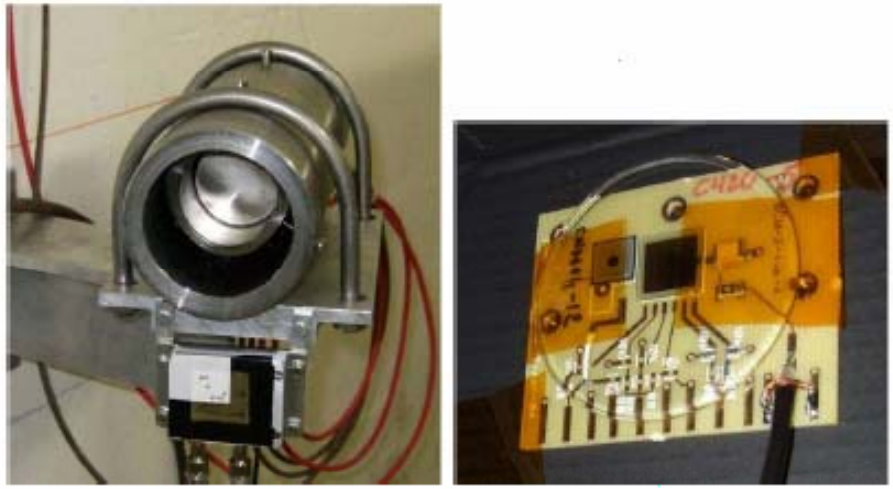
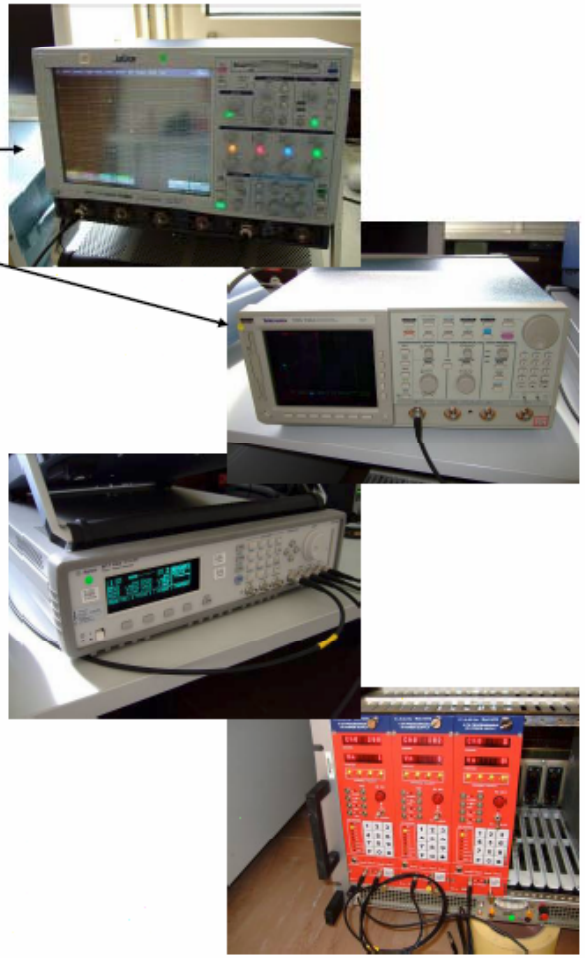


Fig. 4. Left: photo showing one detector assembly: the ACEM detector is located at the top with the pCVD diamond box at the bottom. Right: the board housing the pCVD diamond detector (center) and a pin diode (top left).

The pCVD diamond detectors are of a similar type as those used as beam loss monitors around the interaction regions of the LHC. They are known to be radiation hard and capable of measuring high particle fluxes such as those expected close to the MERIT target [8]. The expected particle flux (charged hadrons) per square centimeter around the experimental setup at the locations of the detector assemblies is shown in Fig 5. For the maximum beam intensity it corresponds to about 10^8 MIP per detector (active area $0.75\,\mathrm{mm} \times 0.75\,\mathrm{mm}$, $0.5\,\mathrm{mm}$ thickness) generating a huge instantaneous current of several amps. A large discharge capacitor of 100 nF was added in the readout circuit to maintain the bias voltage at the detector and allow to extract the signal at all cases. The detectors were read-out using digital oscilloscopes.

Equipment specifications

- Oscilloscopes (2)
  - LeCroy WavePro 7100A: 4 CH, 2.5 GS/s, Ethernet
  - Tektronix 744A: 4 CH, 500 MS/s, GPIB
- Pulse generatorm (1)
  - Agilent 81110A, GPIB
    - Receives a main trigger signal and distributes it to the oscilloscopes.
    - The original purpose of this was to easily generate single or double triggers to the oscilloscopes, depending on the pump/probe time interval. At longer intervals, the oscilloscope sampling has to be divided in 2 segments due to memory restrictions.
    - At the moment, the long (~ms) time separations are not accelerator feasible so a single trigger will most likely do in all scenarios. Nevertheless, the pulse generator is kept as a safety net for revival of the ms intervals.
- Power Supplies (2)
  - CAEN N470: 4 HV channels, 0-3 kV, NIM crate. Daisy connected using LEMO cables and PC communication with a PCI CAENET A1303 card.



Communication