01. I.T.S.
02. F.M.D.
03. T.P.C.
04. T.R.D.
05. T.O.F.
06. H.M.P.I.D.
07. PH.O.S. C.P.V.
08. L3 MAGNET
09. ABSORBER
10. TRACKING CHAMBERS
11. MUON FILTER
12. TRIGGER CHAMBERS
13. DIPOLE MAGNET
14. P.M.D.
15. COMPENSATOR MAGNET
16. C.A.S.T.O.R.

Fig.1: Layout of the ALICE detector. The Transition Radiation Detector (4) is the cyan component placed between the TPC (3) and TOF (5).
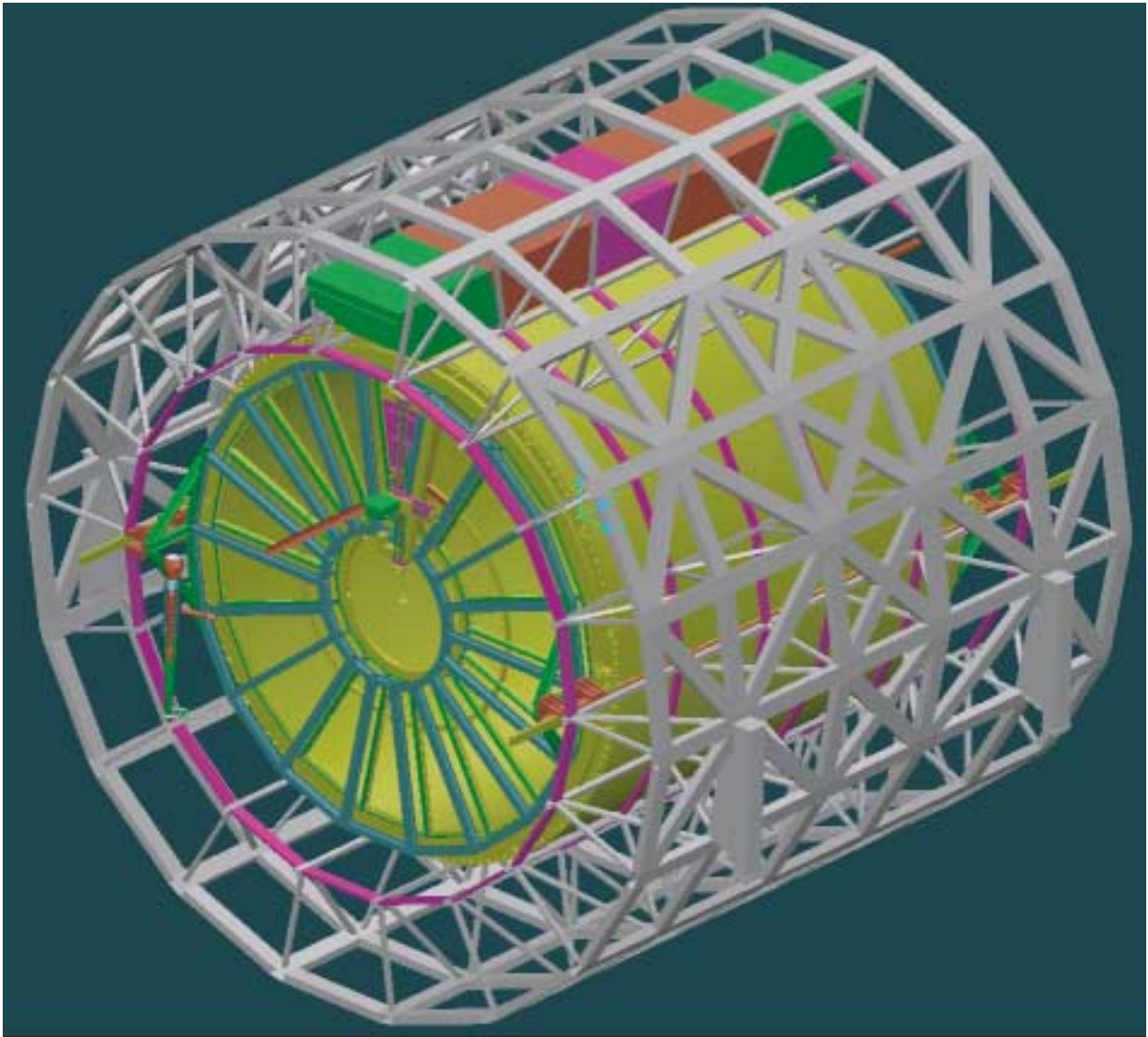
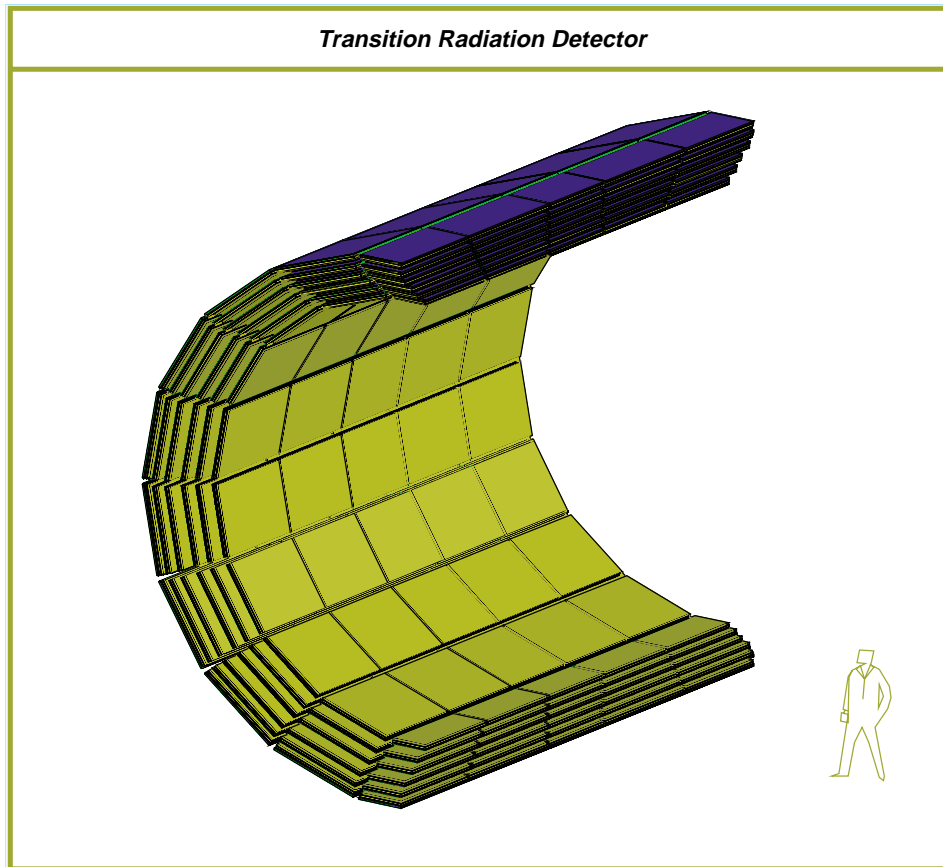Fig.2: One supermodule of the TRD in the ALICE spaceframe.

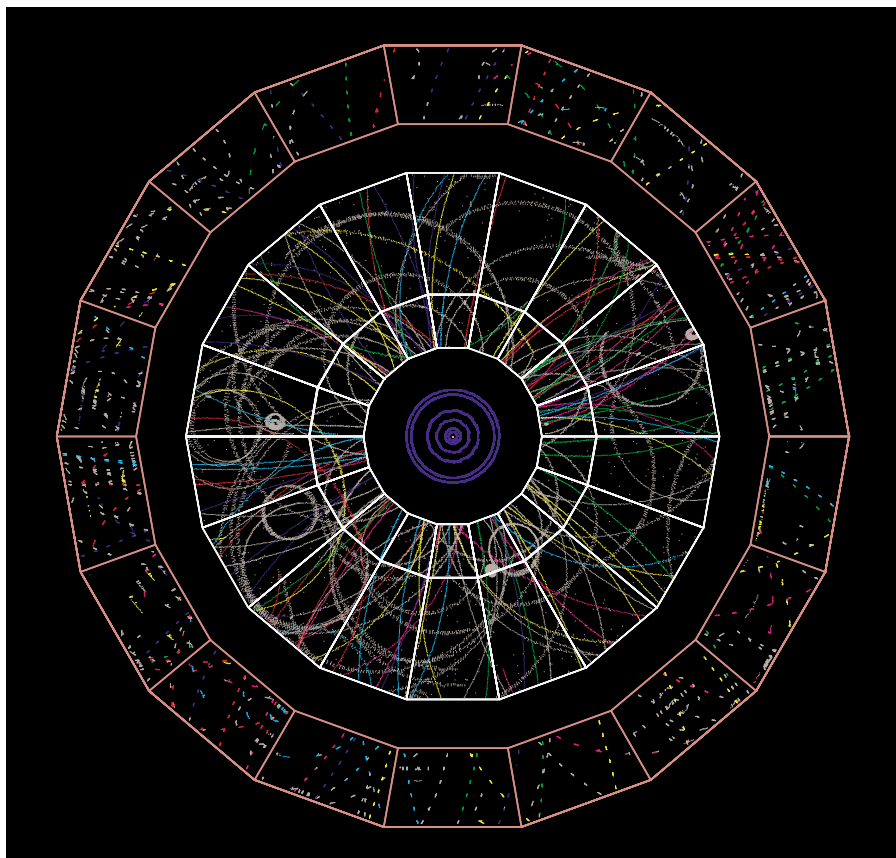Fig.3: Cut through the TRD geometry as implemented in the simulation package AliRoot.

Fig.4: An Aliroot event in TRD and TPC (projection onto a transversal plane) corresponding to 1/500 of the full multiplicity (dN/dy=8000) in Pb+Pb collisions at LHC.
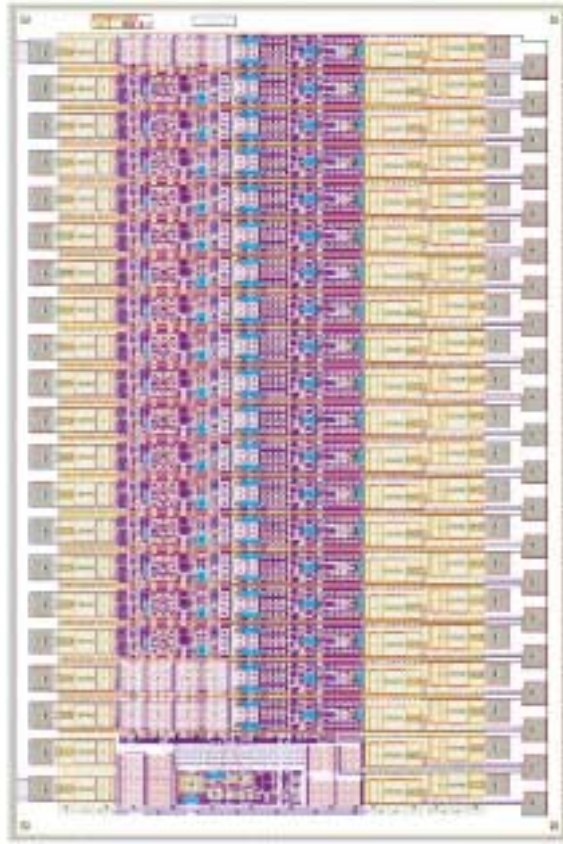
Fig.5: Preamplifier/shaper chip layout (2nd prototype) in 0.35 micron technology (AMS). See Chapter 5 for details.
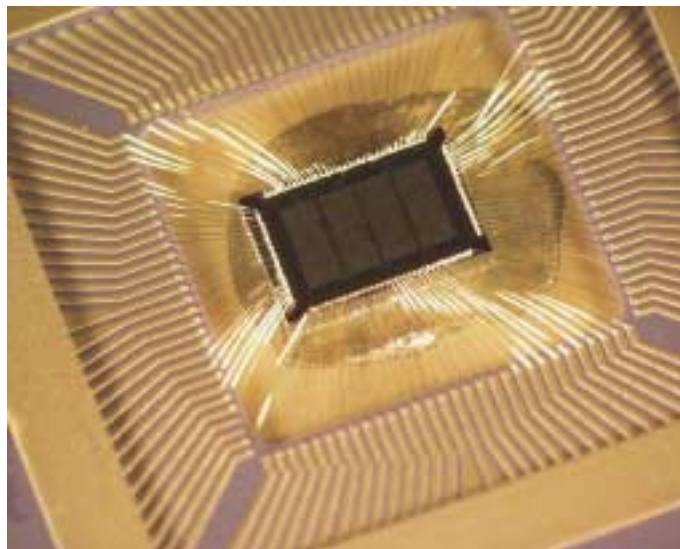

Fig.6: First prototype of an 8-channel digital chip (FaRo) in 0.35 micron technology (AMS). See Chapter 6 for details.
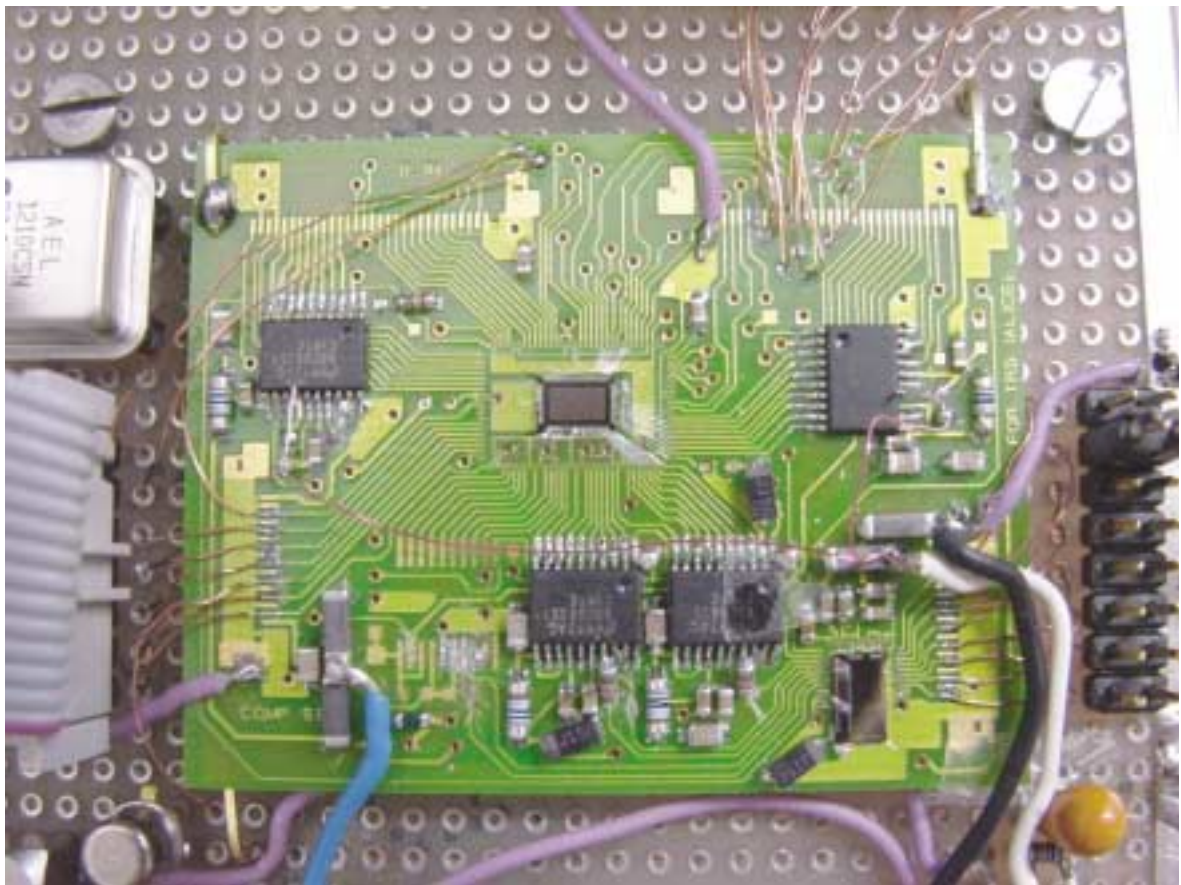
Fig.7: First prototype of an 8-channel multi-chip module with discrete ADCs. The preamplifier/shaper chip is located in the bottom right corner, the digital chip is in the center of the board.
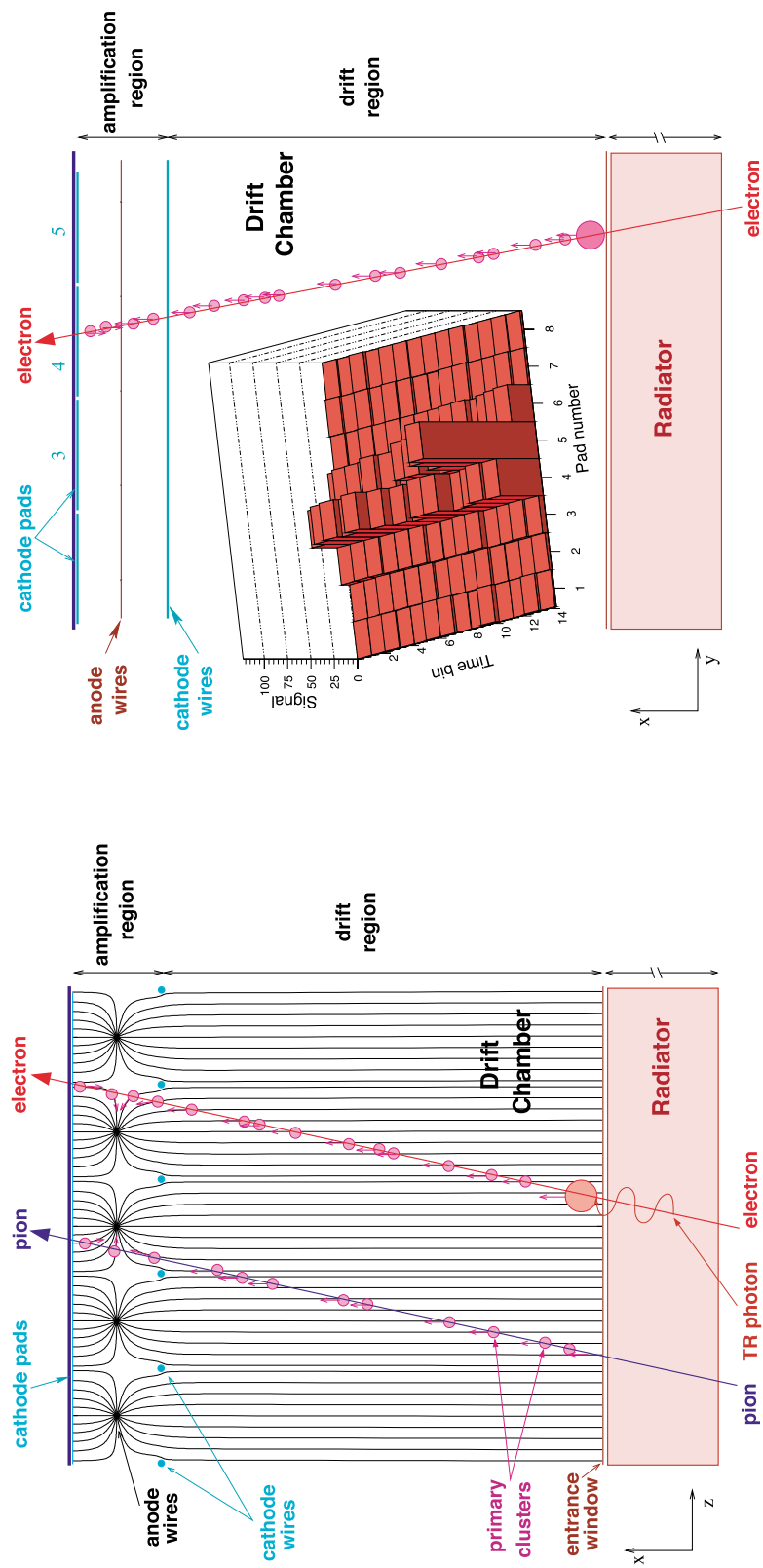
Fig.8: A schematic illustration of the TRD principle. The left panel shows a projection in the x-z plane. The field lines in the Drift Chamber are calculated with GARFIELD. Schematic signals produced by a pion and an electron are shown. The right panel shows a projection in the x-y plane. The insert shows for a measured electron track the distribution of pulse height over pads and timebins spanning the drift region. Note that the radiator is not to scale and the wire geometry may not be the final one.

Fig.9: Photograph of the beam tests setup for use at the secondary pion beam at GSI. The TRD drift chamber is the largest detector on the blue stand. The racks on the right side are the prototype gas system.
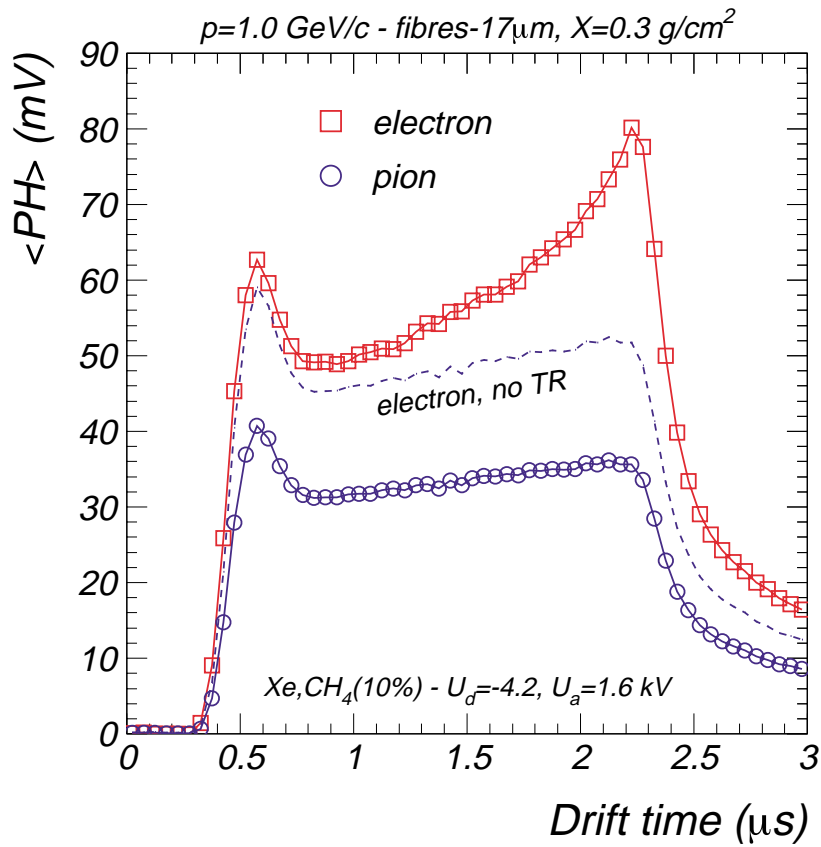
Fig.10: Average pulse height as function of the drift time for pions and electrons for a momentum of 1 GeV/c. The dashed line represents the energy deposit by pure ionization in case of electrons. A fibre radiator of 17 microns diameter has been used (see Chapter 14).
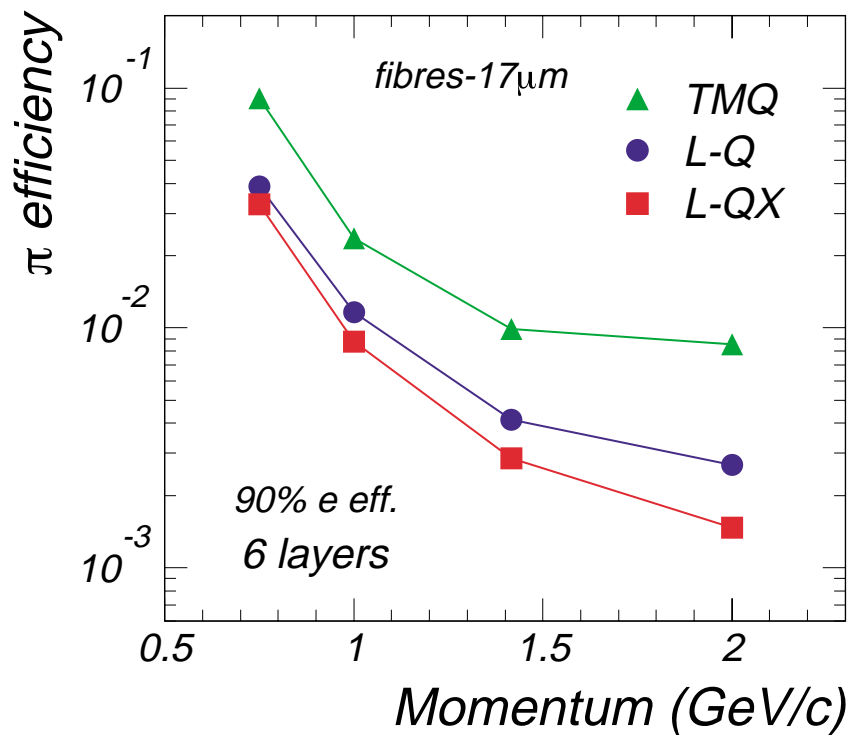

Fig.11: Pion efficiency as function of momentum for a fibre radiator of 17 microns diameter. Three methods of analysis are compared: truncated mean on total charge (TMQ), likelihood on total charge deposit (L-Q) and two-dimensional likelihood on total charge deposit and position of the largest cluster in the drift time (L-QX).