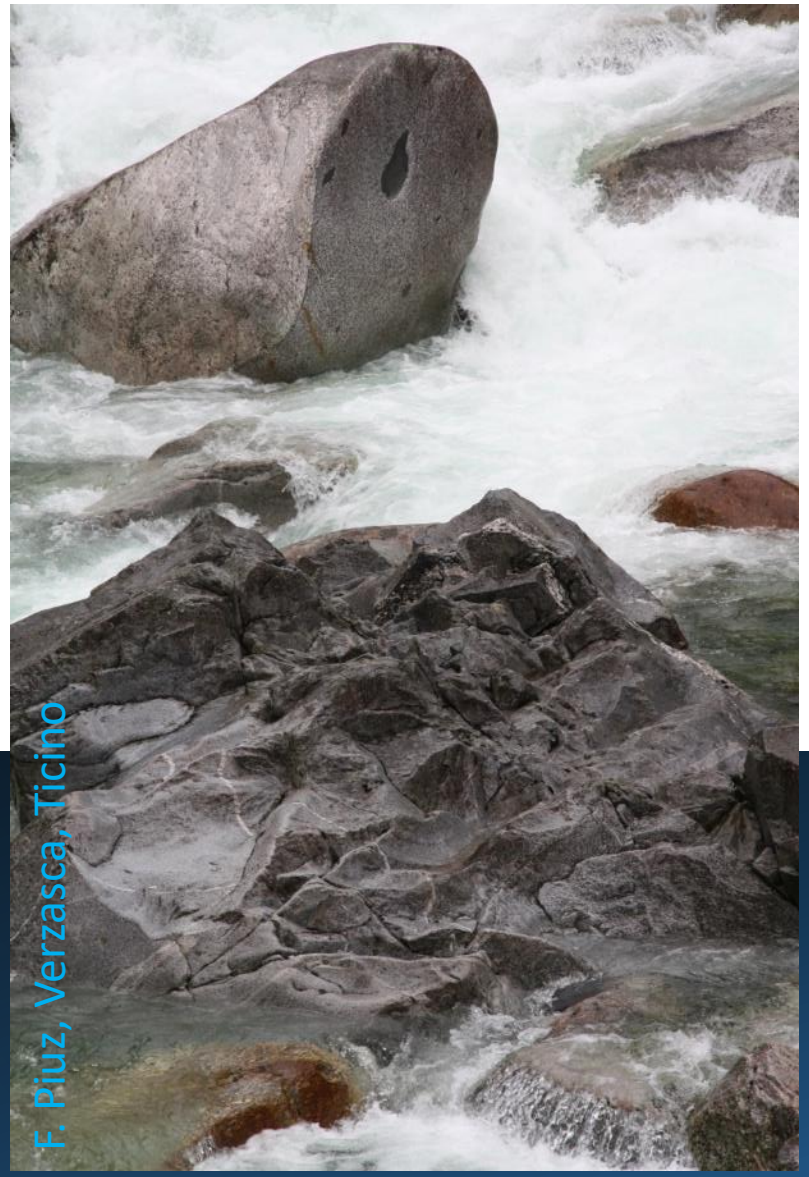
Homage to Francois Piuz (1937-2022)

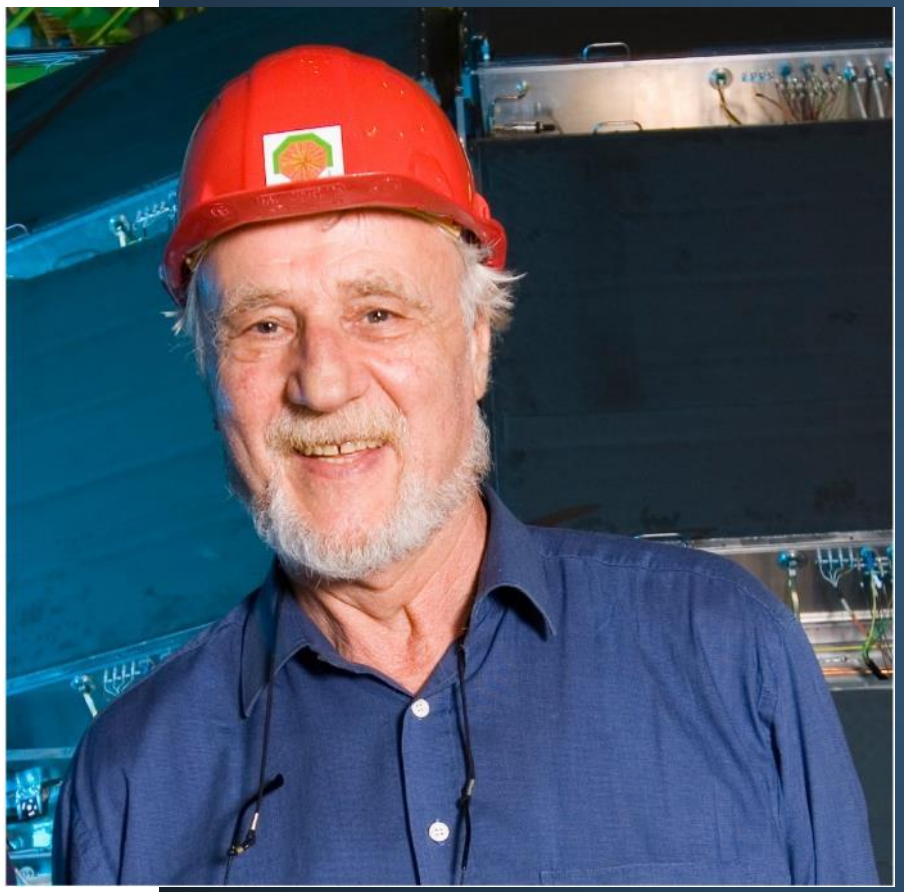
Antonello Di Mauro
(CERN)

RICH2022 Edinburgh, 15/09/22



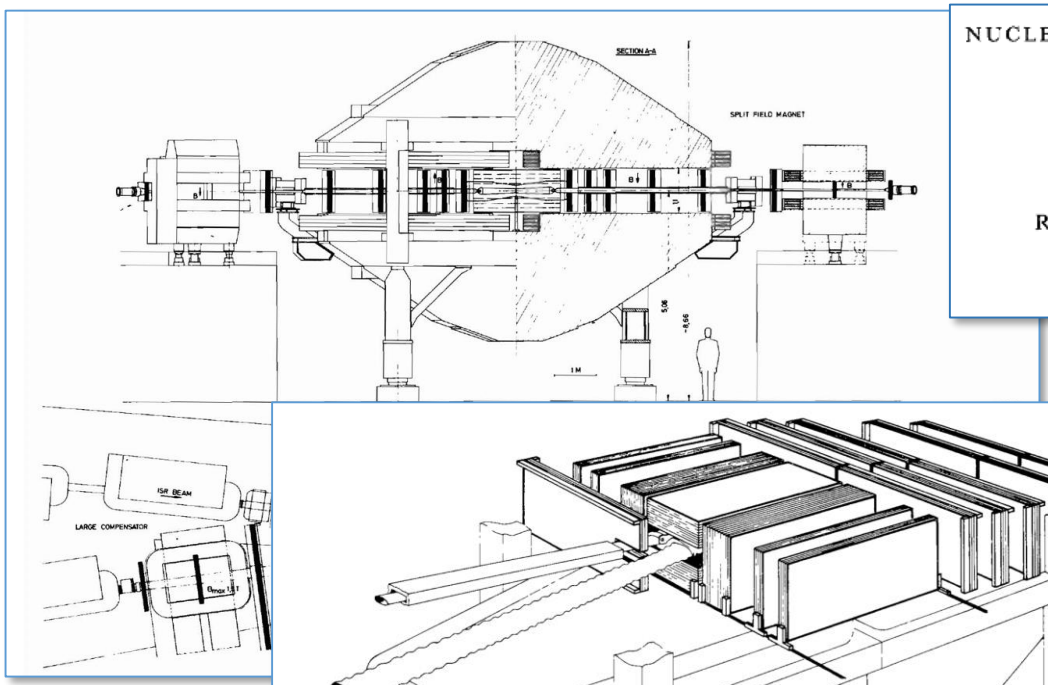
Francois Piuz short CV

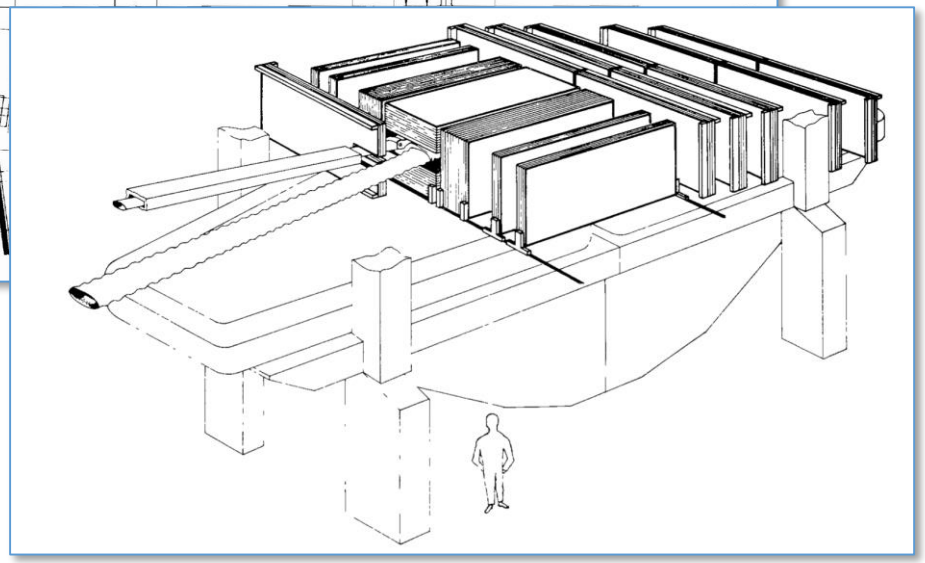
- Born in Paris in 1937
- 1960 Diploma in physics engineering at the EPUL (now EPFL) in Lausanne
- 1968 First contract at CERN
- 1969 PhD in physics at the EPFL
- 1981 Leader of Detector Support II Group in the EF department
- 1984-89 Section leader of various experiments: WA75, NA34, Jetset
- 1992-98 RD26 co-project leader
- 1993-2000 ALICE HMPID project leader
- 2002 retirement and ALICE honorary membership



Early career (1968-1980): the MWPC and dE/dx age

1970 – 1975: Francois Piuz contributed noticeably to basic studies of MWPCs for tracking and PID, and to the construction and operation of the first massive application of MWPCs in A. Minten and G. Charpak group for the Split Field Magnet facility at the CERN Intersecting Storage Ring (50000 wires in total).





NUCLEAR INSTRUMENTS AND METHODS 115 (1974) 235–244; © NORTH-HOLLAND PUBLISHING CO.

PROPORTIONAL CHAMBERS FOR A 50 000-WIRE DETECTOR

R. BOUCLIER, G. CHARPAK, E. CHESI, L. DUMPS, H. G FISCHER, H. J. HILKE, P G. INNOCENTI, G. MAURIN, A MINTEN, L. NAUMANN, F PIUZ, J. C SANTIARD and O ULLALAND*

CERN, Geneva, Switzerland

NUCLEAR INSTRUMENTS AND METHODS 125 (1975) 19–24; © NORTH-HOLLAND PUBLISHING CO.

A VERTEX DETECTOR WITH MULTIGAP PROPORTIONAL CHAMBERS

R. BOUCLIER, R. C. A. BROWN, E. CHESI, L. DUMPS, H. G. FISCHER, P. G. INNOCENTI, G. MAURIN, A. MINTEN, L. NAUMANN, F. PIUZ and O. ULLALAND*

CERN, Geneva, Switzerland

NUCLEAR INSTRUMENTS AND METHODS 100 (1972) 157–164; © NORTH-HOLLAND PUBLISHING CO.

SOME PROPERTIES OF STACKS OF DISCHARGE CHAMBERS WITH INFINITELY TRANSPARENT ELECTRODES

G. CHARPAK, A. BRESKIN and F. PIUZ

CERN, Geneva, Switzerland

A. Breskin's PhD thesis

Early career (1968-1980): the MWPC and dE/dx age

Four contributions to the 1st Vienna Wire Chambers conference in 1978

SFM upgrade:

- Increase to 73000 wires and 300 m^2
- Add dedicated dE/dx and vertex detectors

NUCLEAR INSTRUMENTS AND METHODS 156 (1978) 97-101 ; © NORTH-HOLLAND PUBLISHING CO.

A MWPC AS AN ENERGY LOSS DETECTOR FOR THE ISR

H. FREHSE, M. HEIDEN*, M. PANTER and F. PIUZ

CERN, Geneva, Switzerland

NUCLEAR INSTRUMENTS AND METHODS 156 (1978) 111-114 ; © NORTH-HOLLAND PUBLISHING CO.

A SYSTEM OF MULTIGAP PROPORTIONAL WIRE CHAMBERS

W. BELL, L. DUMPS, H. G. FISCHER, H. FREHSE, F. GAGLIARDI, B. HECK, P. G. INNOCENTI, G. MAURIN, L. NAUMANN, A. NORTON, F. PIUZ, M. SCIRÈ and O. ULLALAND

CERN, Geneva, Switzerland

NUCLEAR INSTRUMENTS AND METHODS 156 (1978) 267-274; © NORTH-HOLLAND PUBLISHING CO.

A DRIFT CHAMBER VERTEX DETECTOR FOR INTERSECTING STORAGE RINGS

C. W. FABJAN, J. LINDSAY, F. PIUZ, F. RANJARD, E. ROSSO, A. RUDGE, S. SEREDNYAKOV, W. J. WILLIS

CERN, Geneva, Switzerland

H. B. JENSEN and J. O. PETERSEN

Niehls Bohr Institute, Copenhagen, Denmark

LEAR INSTRUMENTS AND METHODS 156 (1978) 87-96 ; © NORTH-HOLLAND PUBLISHING CO.

ENERGY LOSS MEASUREMENT IN A MWPC

H. FREHSE, F. LAPIQUE*, M. PANTER† and F. PIUZ

CERN, Geneva, Switzerland

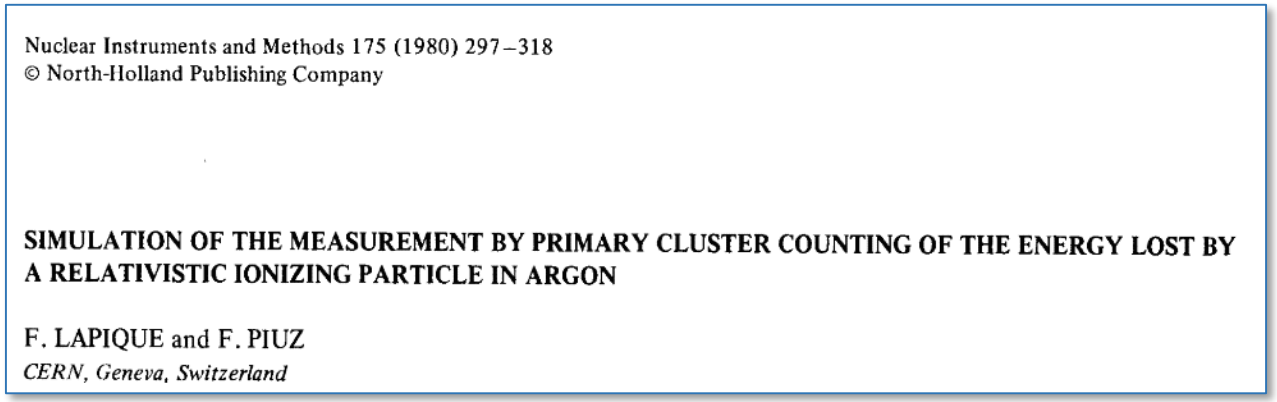
Olav Ullaland :

"Francois was one of my first collaborators at CERN and more specifically in the Minten & Charpak group, the (in)famous Split Field Magnet Detector group. It was surely due to people like Francois, and Hans Gerhard (Fischer), that we finally could take data with the instrument and get the first MWPC-dE/dx detector working."

Early career (1968-1980): the MWPC and dE/dx age

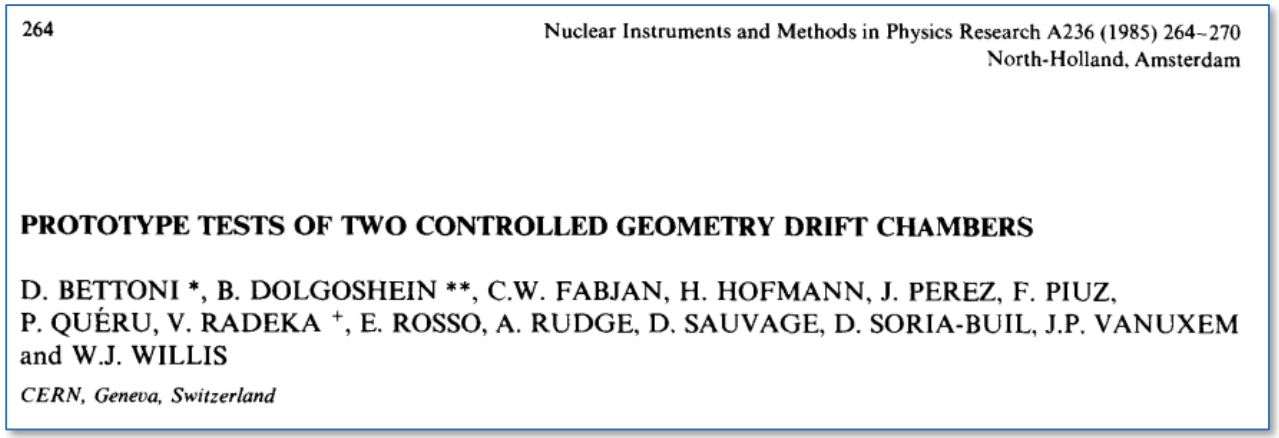
Following A. Walenta's cluster counting proposal to improve dE/dx measurements… impressive and detailed work on theoretical treatment and simulation of the process

Jerry Va'vra:
"His cluster counting paper … was one of the first crucial pioneering papers on this topic, from which we all learned."


Nuclear Instruments and Methods 175 (1980) 297–318

SIMULATION OF THE MEASUREMENT BY PRIMARY CLUSTER COUNTING OF THE ENERGY LOST BY A RELATIVISTIC IONIZING PARTICLE IN ARGON

F. LAPIQUE and F. PIUZ
CERN, Geneva, Switzerland



Nuclear Instruments and Methods in Physics Research A236 (1985) 264–270
North-Holland, Amsterdam

PROTOTYPE TESTS OF TWO CONTROLLED GEOMETRY DRIFT CHAMBERS

D. BETTONI *, B. DOLGOSHEIN **, C.W. FABJAN, H. HOFMANN, J. PEREZ, F. PIUZ, P. QUÉRU, V. RADEKA +, E. ROSSO, A. RUDGE, D. SAUVAGE, D. SORIA-BUIL, J.P. VANUXEM and W.J. WILLIS
CERN, Geneva, Switzerland

Chris Fabjan:

"… His work on the concept of "ionization clusters" in the MWPC became a classic, crucial to the development of particle identification based on multiple measurements of ionization, which was subsequently exploited to great effect in many experiments… Another highlight that came from his insightful understanding was the development of a novel drift chamber topology capable of measuring particles with exceptional spatial resolution and multi-track separation, as required for the SPS experiments in the 1980s."

1980-1990: the silicon detectors age

Nuclear Instruments and Methods 178 (1980) 331–343

A SILICON SURFACE BARRIER MICROSTRIP DETECTOR DESIGNED FOR HIGH ENERGY PHYSICS

E.H.M. HEIJNE, L. HUBBELING, B.D. HYAMS, P. JARRON, P. LAZEYRAS, F. PIUZ, J.C. VERMEULEN and A. WYLIE
CERN, Geneva, Switzerland

European Physical Society
High Energy and Particle Physics Division

The **2017 High Energy and Particle Physics Prize** of the EPS for an outstanding contribution to High Energy Physics is awarded to **Erik H.M. Heijne**, **Robert Klanner**, and **Gerhard Lutz** "for their pioneering contributions to the development of silicon microstrip detectors that revolutionised high-precision tracking and vertexing in high energy physics experiments".

First silicon detectors successfully operated in HEP experiments

Nuclear Instruments and Methods in Physics Research A248 (1986) 337–353
North-Holland, Amsterdam

A SYSTEM OF 4400 SILICON MICROSTRIPS READOUT WITH ANALOG MULTIPLEXED ELECTRONICS USED IN THE WA75 EXPERIMENT

R. ALBERGANTI, E. CHESI, Ch. GERKE *, F. PIUZ, L. RAMELLO ** and T.D. WILLIAMS
CERN, Geneva, Switzerland

R. ROOSEN
Vrije Universiteit Brussels, Brussels, Belgium

Nuclear Instruments and Methods in Physics Research A252 (1986) 471–477
North-Holland, Amsterdam

PERFORMANCE OF A NOVEL SILICON DETECTOR

R. BEUTTENMULLER, H.W. KRANER, T.W. LUDLAM, V.A. POLYCHRONAKOS and V. RADEKA
Brookhaven National Laboratory, Upton, New York 11973-5000, USA

E. CHESI, C.W. FABJAN, F. PIUZ, J.S. RUSS and A. TSCHULIK
CERN, Geneva 23, Switzerland

and

M.J. ESTEN
University College London, UK

1st Si pixel sensors!

Physics Research A253 (1987) 500–510
North-Holland, Amsterdam

SILICON POSITION SENSITIVE DETECTORS FOR THE HELIOS (NA 34) EXPERIMENT*

R.H. BEUTTENMULLER[1], V. BISI[6], E. CHESI[2], R.P. Di NARDO[1], M.J. ESTEN[3], P. GIUBELLINO[6], H.W. KRANER[1], T.W. LUDLAM[1], F. MEDDI[5], F. PIUZ[2], V.A. POLYCHRONAKOS[1], V. RADEKA[1], L. RAMELLO[6], R. ROOSEN[4] and A. TSCHULIK[2]

[1]*Brookhaven National Laboratory, Upton, New York 11973-5000, USA*
[2]*CERN, Geneva 23, Switzerland*
[3]*University College, London, UK*
[4]*Vrye Universiteit, Brussels, Belgium*
[5]*University of Rome, Rome, Italy*
[6]*University of Torino, Torino, Italy*

1990-2002: the CsI-RICH age

602

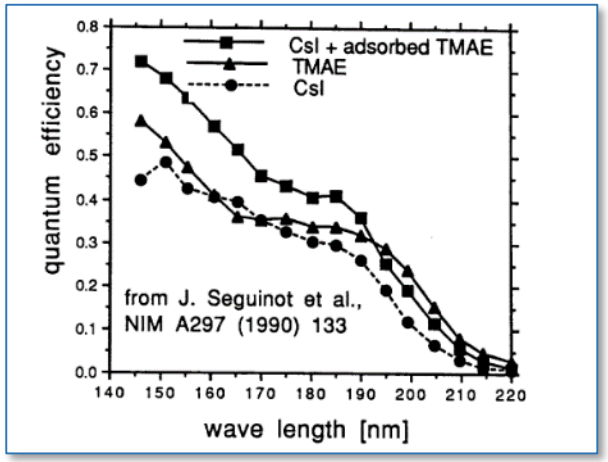
Nuclear Instruments and Methods in Physics Research A283 (1989) 602–607
North-Holland, Amsterdam

FAST RICH DETECTOR USING A MWPC AT ATMOSPHERIC PRESSURE WITH A PAD STRUCTURE READOUT BY VLSI CIRCUITS

E. CHESI [1], P. MARTINENGO [2], F. PIUZ [1] and T.D. WILLIAMS [1]

[1] *CERN, European Organization for Nuclear Research, Geneva, Switzerland*
[2] *Genova University, Genova, Italy*

- Availability of first VLSI electronics: pixelated MWPC R/O with FEE ("Fast-RICH" approach)
- J. Seguinot pioneering work on CsI in gaseous photodetectors



→ **RD26 proposal**

Large area CsI photocathodes in MWPC for RICH applications @LHC operated with heavy-ion

CERN/DRDC92-3
DRDC/P35
13 January 1992

DETECTOR R & D PROPOSAL

DEVELOPMENT OF A LARGE AREA ADVANCED FAST RICH DETECTOR FOR PARTICLE IDENTIFICATION AT THE LARGE HADRON COLLIDER OPERATED WITH HEAVY IONS.

E. Nappi, F. Posa, G. Satalino, T. Scognetti, G. Tomasicchio
INFN Sez. Bari and University of Bari, Italy

A. Braem, E. Chesi, G. Paic*,+, F. Piuz*, J. Schukraft
CERN, Geneva, Switzerland

R. Ferreira-Marques, A. Policarpo, R.S. Ribeiro
L.I.P, University of Coimbra, Coimbra, Portugal

W. Kuhn, R. Novotny
University of Giessen, Germany

J. Friese
Technical University Munich, Germany

P. Sartori
University of Padova, Italy

A Ljubicic Jr, D. Vranic
R. Boskovic Institute, Zagreb, Croatia

Abstract

A proposal is made for R&D support to investigate the feasibility of a fast RICH detector with pad readout for low interaction rate applications (10-100 kHz). Such conditions are met specifically at the Large Hadron Collider when used in heavy ion mode as well as at a number of other applications (tau-Charm, Phi and B factories, SIS and others).

The main objectives are:

- to develop a complete chain of adequate techniques for deposition of photosensitive materials (CsI and similar) on pad electrodes
- to optimize the detector for photon detection efficiency, noise contributions, and radiation thickness
- to develop a specific VLSI front end electronics matched to pad readout of MWPC's with a large number of channels.

Special attention will be paid to the operation of the detector in a high multiplicity environment (≥ 40 m^{-2}), testing a 50x50 cm^2 prototype in the beam.

1990-2002: the CsI-RICH age

The project grow rapidly, attracting the interest of many institutes around the world, and the first results arrived quite soon…

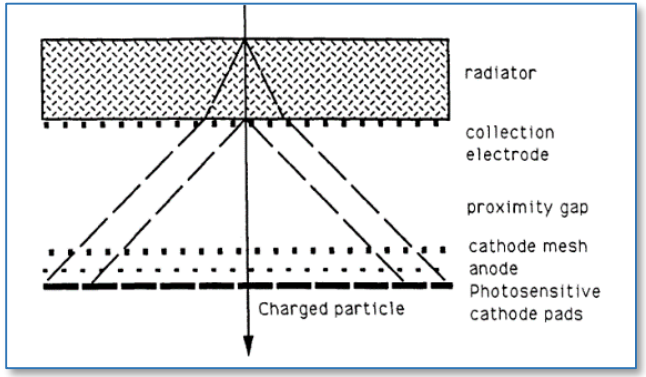
Nuclear Instruments and Methods in Physics Research A 333 (1993) 404–412
North-Holland

NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH
Section A

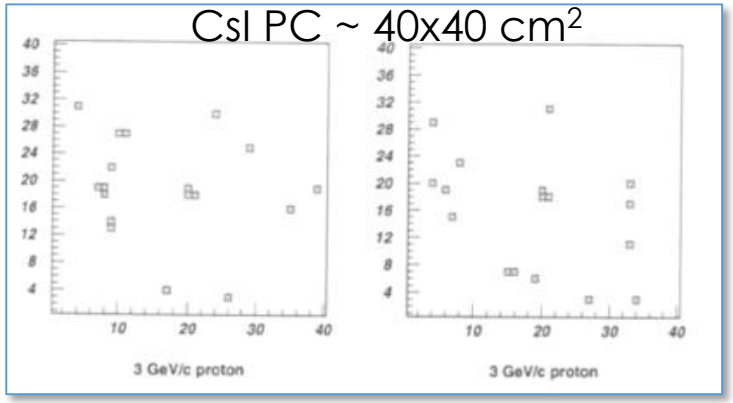
First observation of Cherenkov rings in a fast RICH detector combining a cesium iodide photoconverter with an atmospheric pressure wire chamber *

F. Piuz [a], A. Braem [a], G. Paic [a,b], R.S. Ribeiro [a] and T.D. Williams [a]

[a] *CERN, Geneva, Switzerland*
[b] *Ruder Boskovic, Zagreb, Croatia*



CsI PC ~ 40x40 cm^2



CERN/DRDC 94-49
RD-26 Status Report
21 Dec. 1994

STATUS REPORT OF THE CSI-RICH COLLABORATION/1994

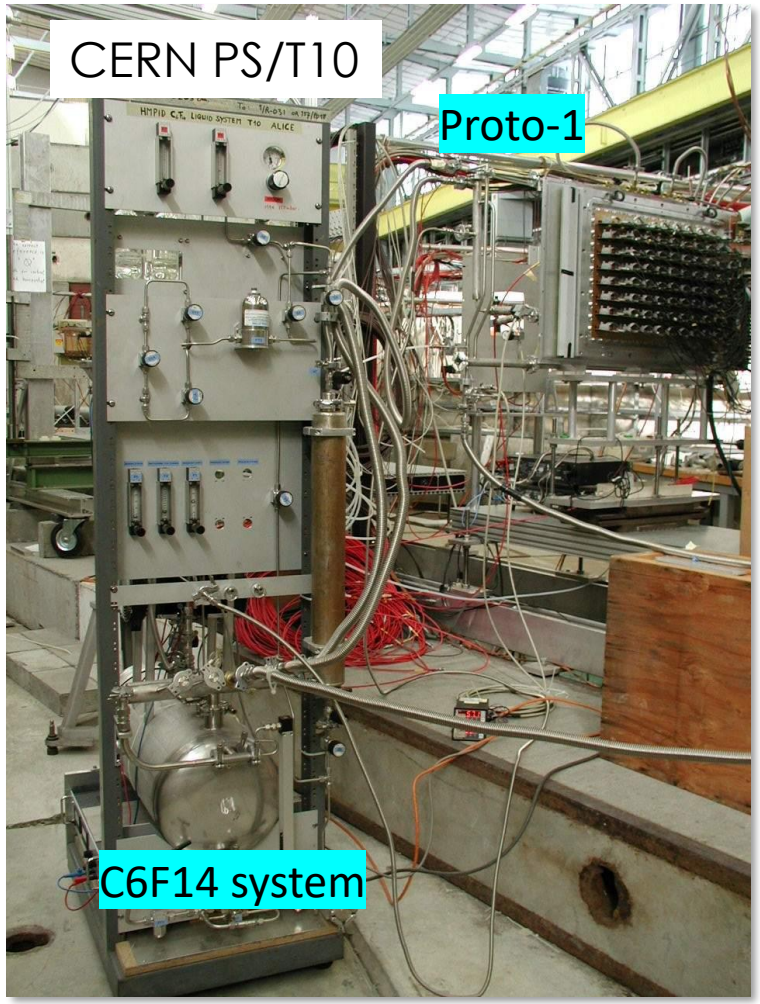
DEVELOPMENT OF A LARGE AREA ADVANCED FAST RICH DETECTOR FOR PARTICLE IDENTIFICATION AT THE LHC OPERATED WITH HEAVY IONS

Bari Polytechnic/INFN, CERN, Coimbra University/LIP, Giessen Univ., Lausanne/EPF-L, Lund Univ., Munich TU, Padova Univ./INFN, Palaiseau/LPNHE- Ecole Polytech., Saclay/DAPNIA-SED, Sanita, INFN, Nantes/SUBATECH, Rehovot/Weizmann Inst., Zagreb/ R. Boskovic Inst.

Spokesmen: G. Paic, F. Piuz

A. di Mauro, L.M. Galantucci, A. Grimaldi, E. Nappi, F. Posa, T. Scognetti, A. Valentini, V. Valentino
INFN Sez. Bari and Politecnico, Bari, Italy
A. Braem, F. Piuz, J.C. Santiard, J. Schukraft, S. Sgobba, T.D. Williams
CERN, Geneva, Switzerland
R. Ferreira-Marques, A. Policarpo
L.I.P., University of Coimbra, Coimbra, Portugal
W. Hejny, W. Kuehn, R. Novotny, S. Riess
University of Giessen, Germany
J. Almeida, H. Berger, C. Coluzza, G. Margaritondo, T. dell'Orto
E. P. F. -Lausanne, Switzerland
H.A. Gustafsson, A. Oskarsson, O. Svensson
University of Lund, Sweden
J. Friese, P. Maier Komor, A. Gillitzer, J. Homolka, K. Zeitelhack
Technical University Munich, Germany
R. Martinelli, L. Peruzzo, P. Sartori, G. Sartori
INFN Sez. Padova, Italy
Ph. Miné, G. Vassileiadis
Palaiseau, LPNHE, Ecole Polytechnique, France
P. Besson, Ph. Bourgeois
Saclay, DAPNIA/SED, France
F. Garibaldi
INFN sez. Sànita, Roma, Italy
G. Paic *)
SUBATECH, Nantes, France
A. Breskin, A. Buzulutskov, R. Chechik
The Weizmann Institute of Science, Rehovot, Israel
A. Ljubicic Jr., T. Tustonic.
R. Boskovic Institute, Zagreb, Croatia
*) on leave of absence from R. Boskovic Institute,Zagreb, Croatia.

1990-2002: the CsI-RICH age



Nuclear Instruments and Methods in Physics Research A 343 (1994) 163–172
North-Holland

NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH
Section A

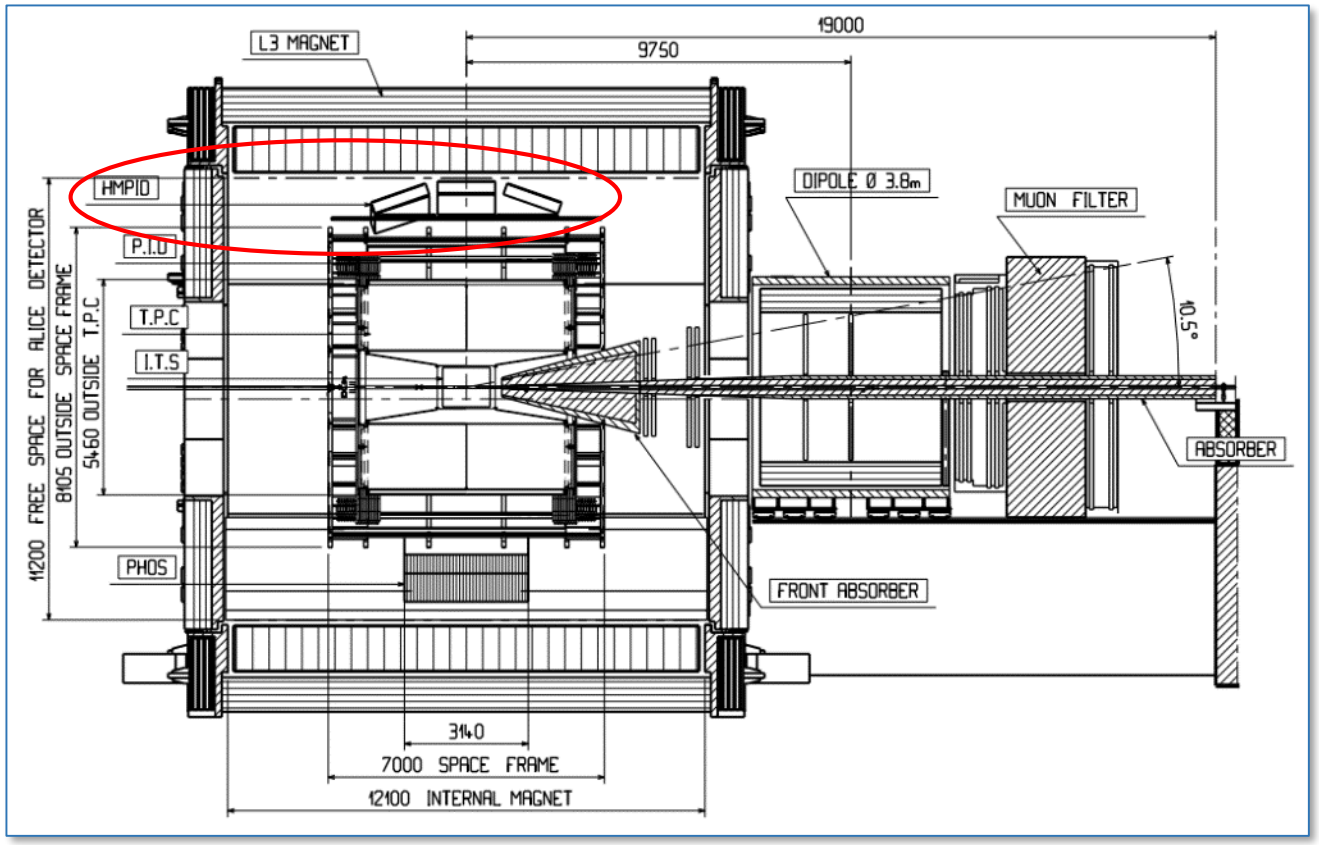
Fast RICH detector with a cesium iodide photocathode at atmospheric pressure

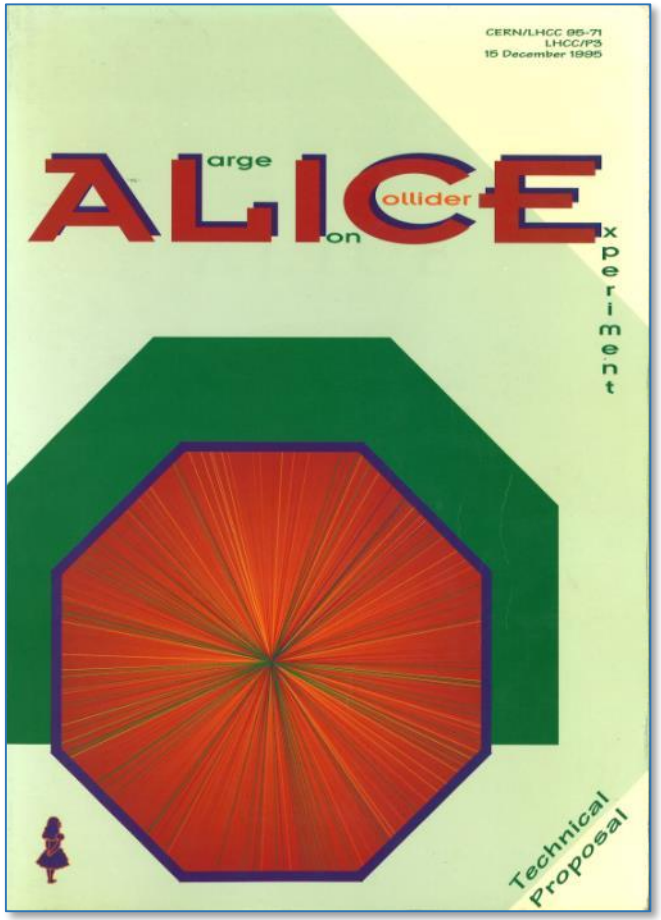
A. Braem [b], A. DiMauro [a], E. Nappi [a], A. Ljubicic Jr. [c,*], G. Paic [b,c,*], F. Piuz [b,**], F. Posa [a], R.S. Ribeiro [b], T. Scognetti [a], T.D. Williams [b]

[a] *INFN and Politecnico, Bari, Italy*
[b] *CERN, Geneva, Switzerland*
[c] *R. Boskovic Institute, Zagreb, Croatia*

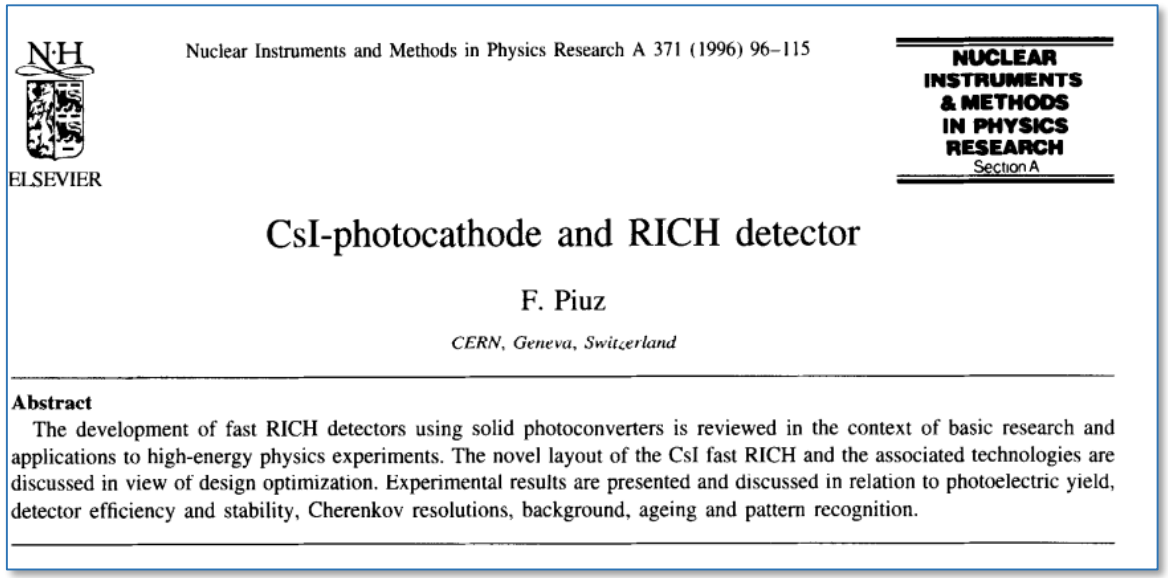
1990-2002: the CsI-RICH age

Steady progress of RD26, the HMPID (High Momentum Particle Identification) RICH is included in the ALICE TP in 1995





1990-2002: the CsI-RICH age



Nuclear Instruments and Methods in Physics Research A 371 (1996) 96–115

NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH Section A

ELSEVIER

CsI-photocathode and RICH detector

F. Piuz

CERN, Geneva, Switzerland

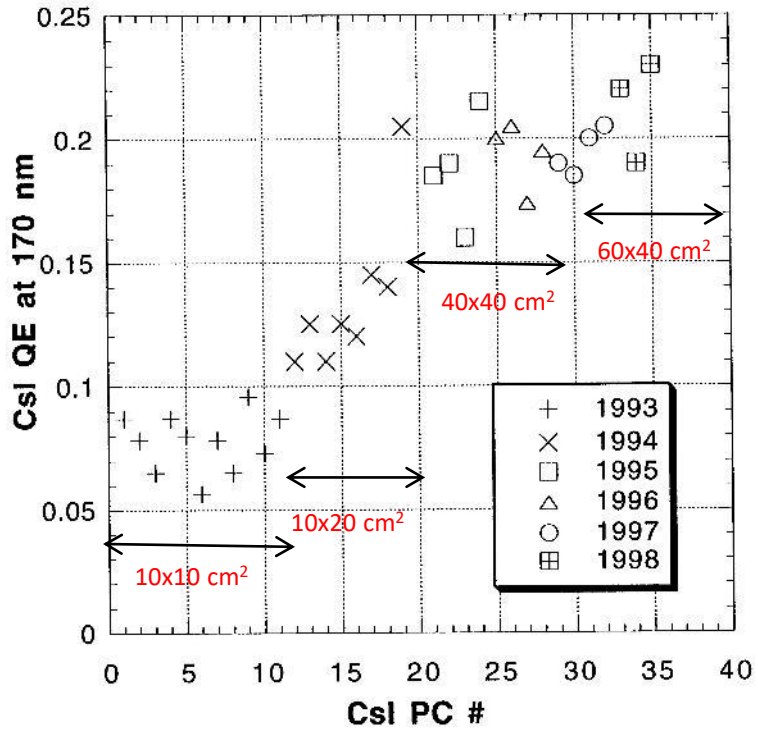
Abstract

The development of fast RICH detectors using solid photoconverters is reviewed in the context of basic research and applications to high-energy physics experiments. The novel layout of the CsI fast RICH and the associated technologies are discussed in view of design optimization. Experimental results are presented and discussed in relation to photoelectric yield, detector efficiency and stability, Cherenkov resolutions, background, ageing and pattern recognition.

- The comprehensive summary of the RD26 project achievements
- **Amos Breskin:** *" He was the moving force behind. Based on his meticulous R&D on detector & electronics, and success, other teams moved to CsI-based detectors, learning from him a great deal."*
- Experiments having used large area CsI PC (beyond ALICE):
  - NA44 @ CERN SPS
  - HADES @ GSI
  - COMPASS @ CERN SPS
  - HALL-A @ JLAB
  - PHENIX @ BNL

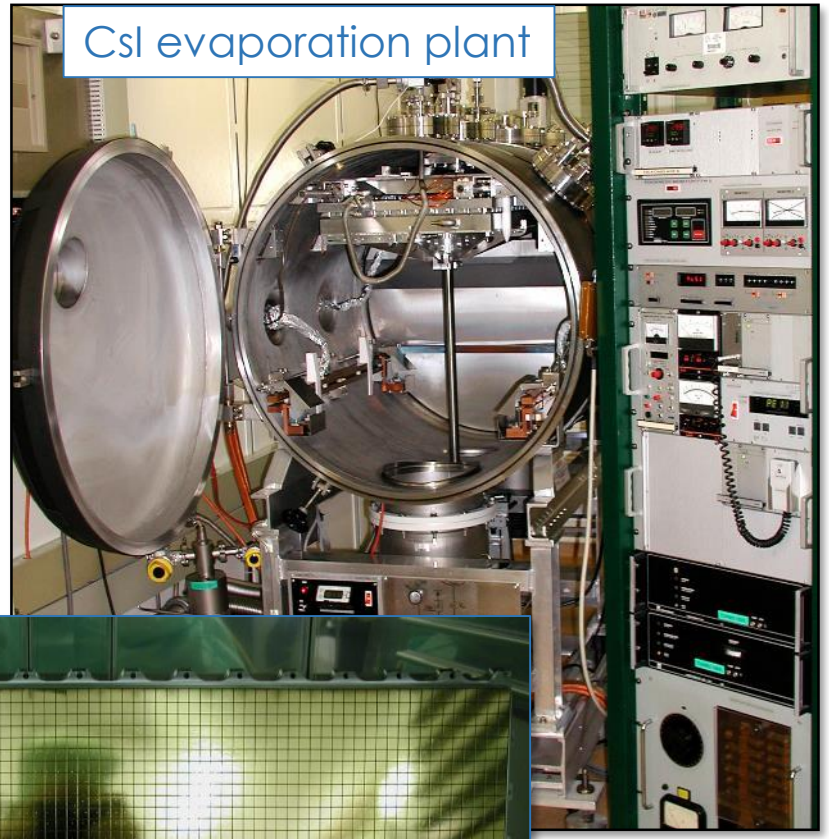
1990-2002: the CsI-RICH age

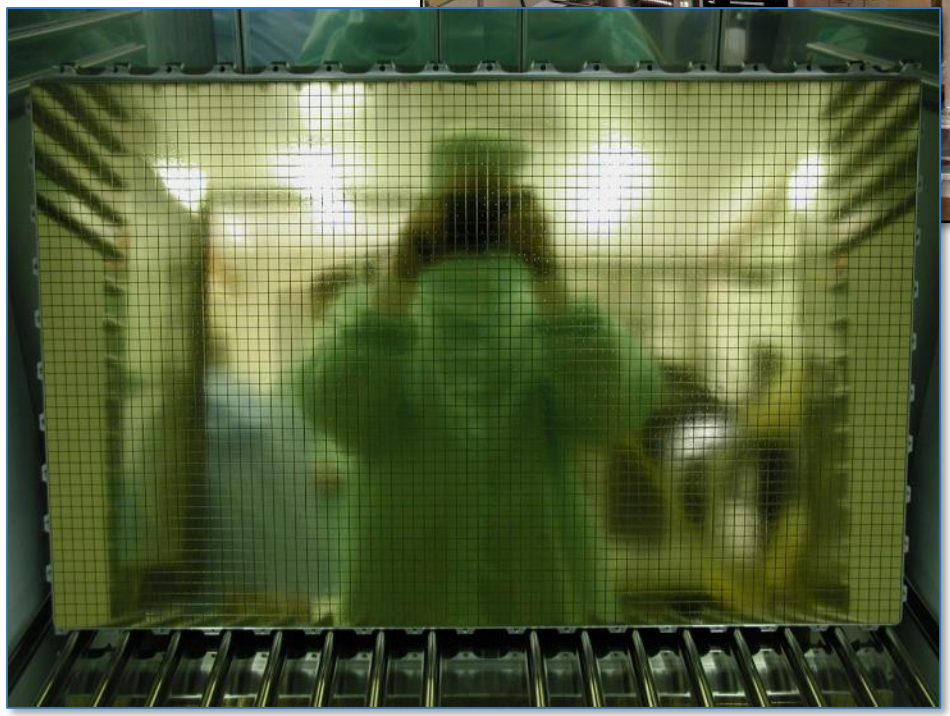
From CERN-LHCC-96-20 (LDRB-Status-Report-RD-26)



Experiment RD26 Development of a Large Area Advanced Fast RICH Detector for Particle Identification at the Large Hadron Collider Operated with Heavy Ions

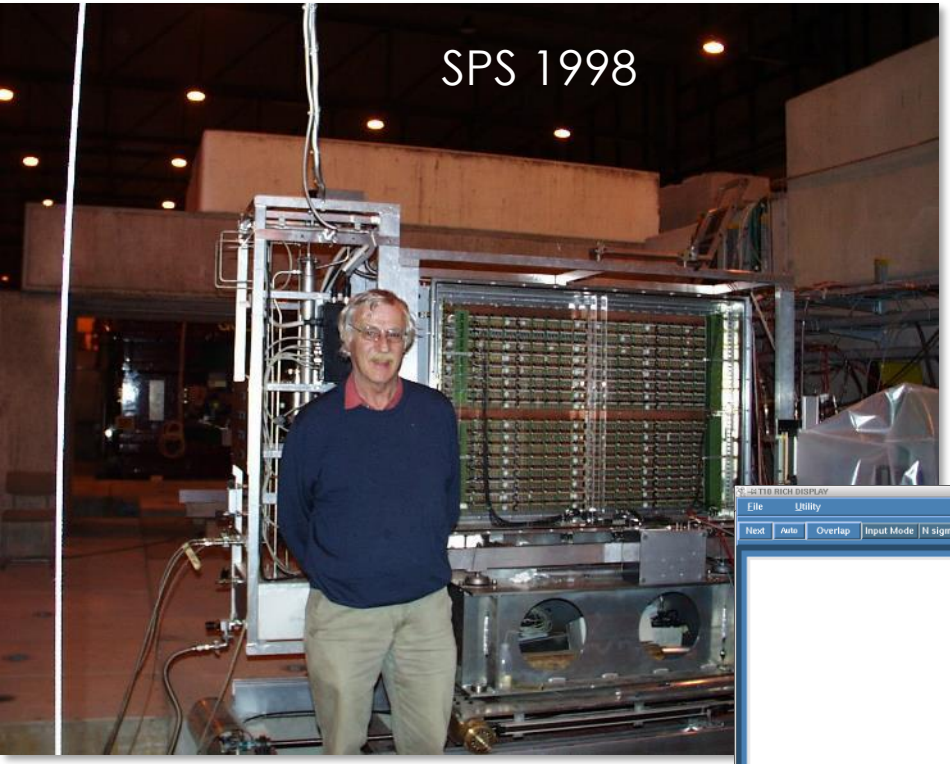
CsI evaporation plant

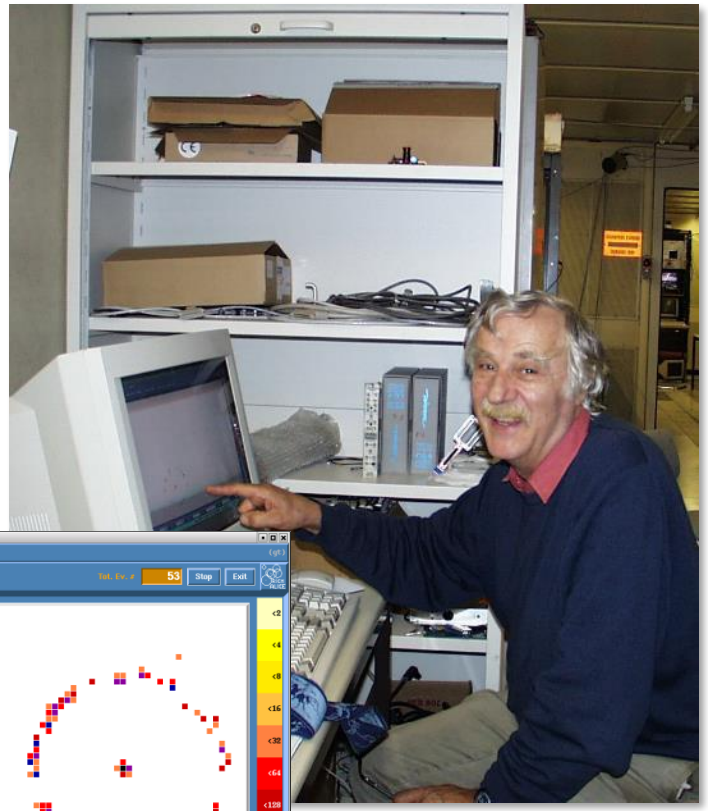


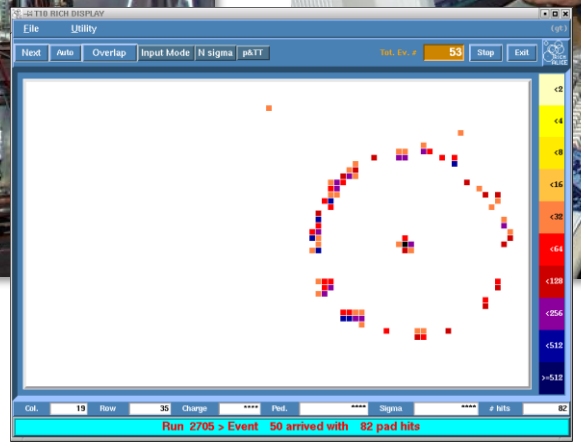


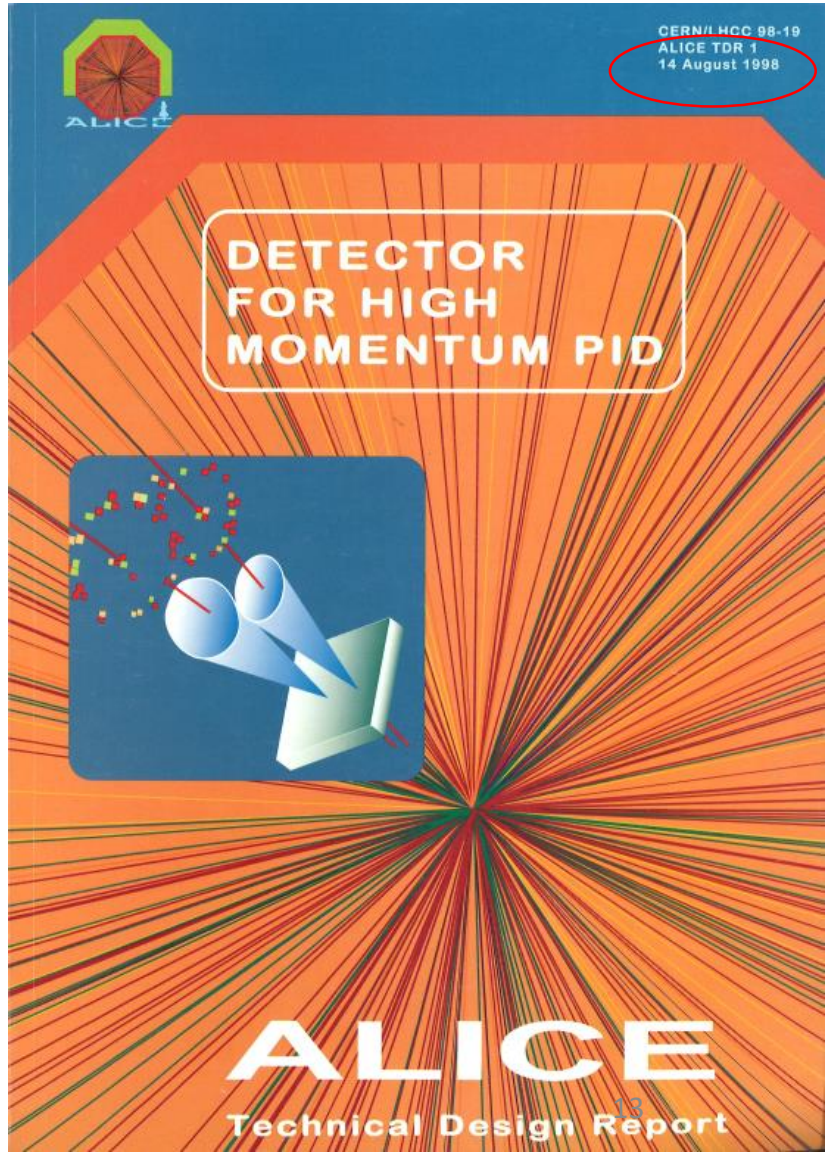
1990-2002: the CsI-RICH age

Proto-2, 2/3 full size module of HMPID detector to validate the design for the TDR



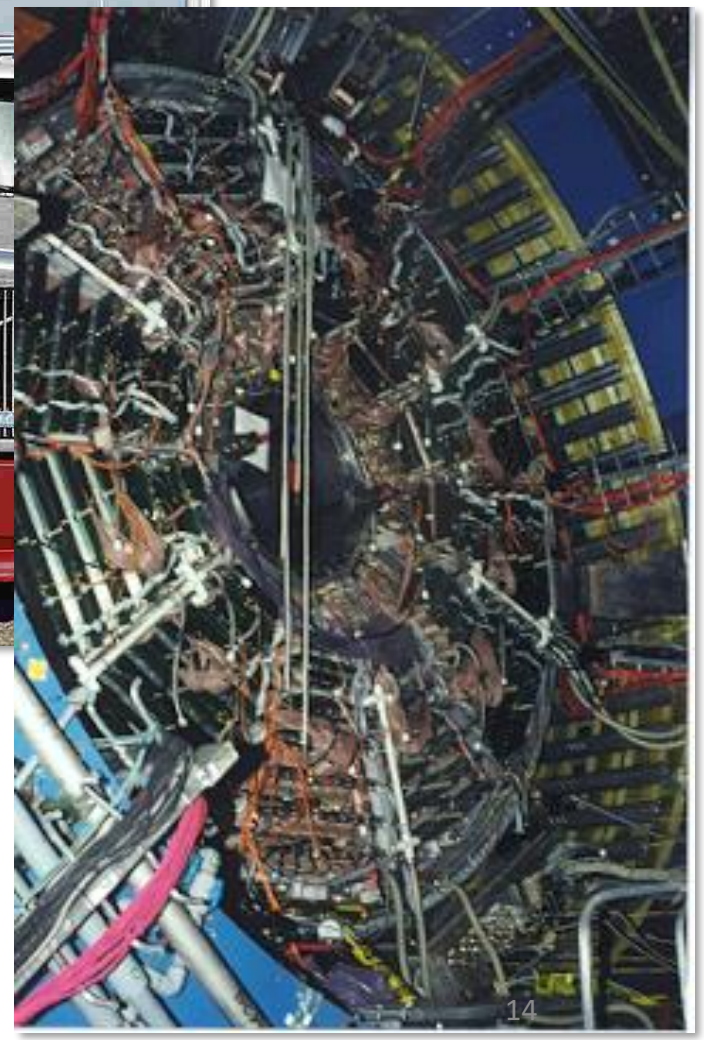




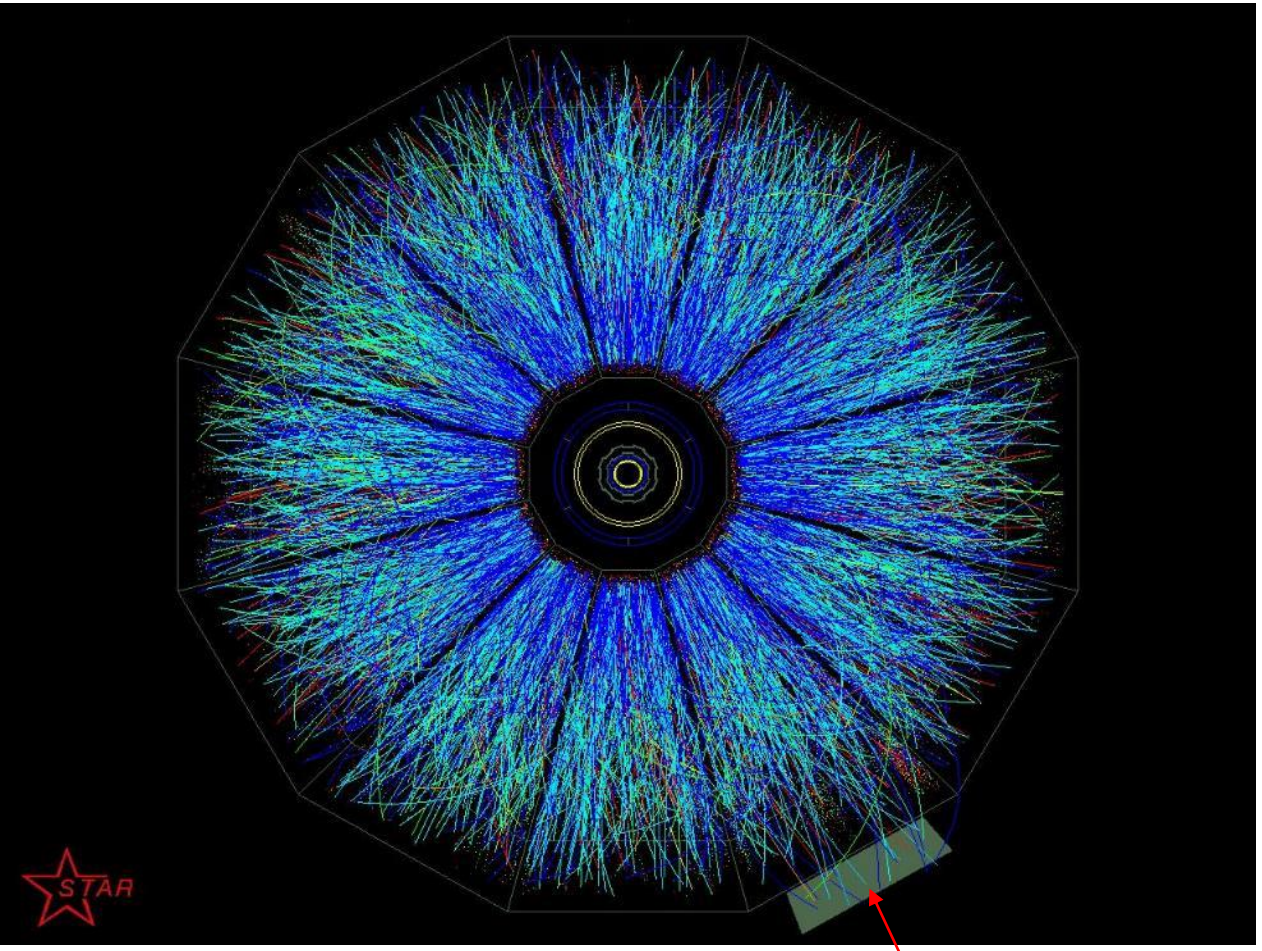


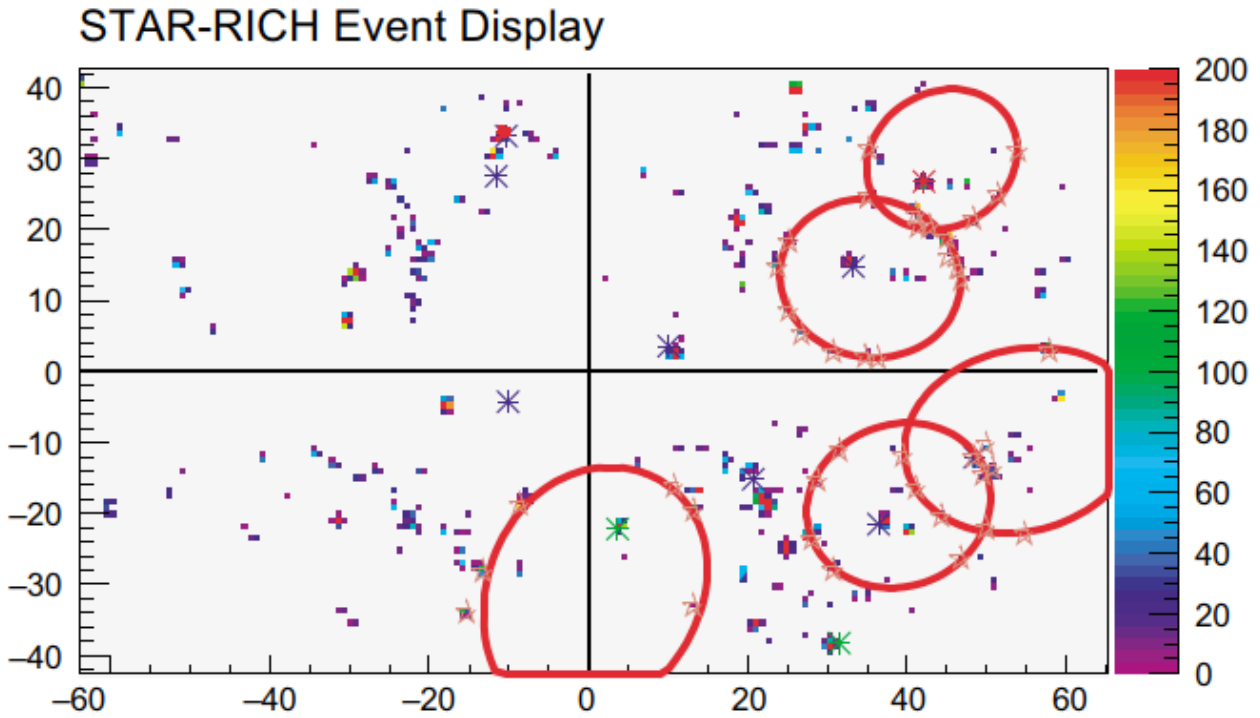
1990-2002: the CsI-RICH age

1999: Proto-2 transport to
BNL and installation in STAR



1990-2002: the CsI-RICH age

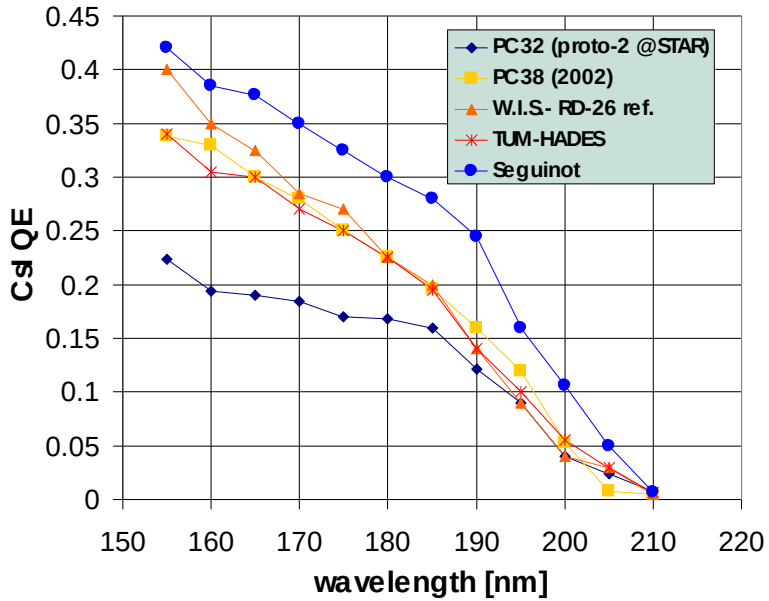


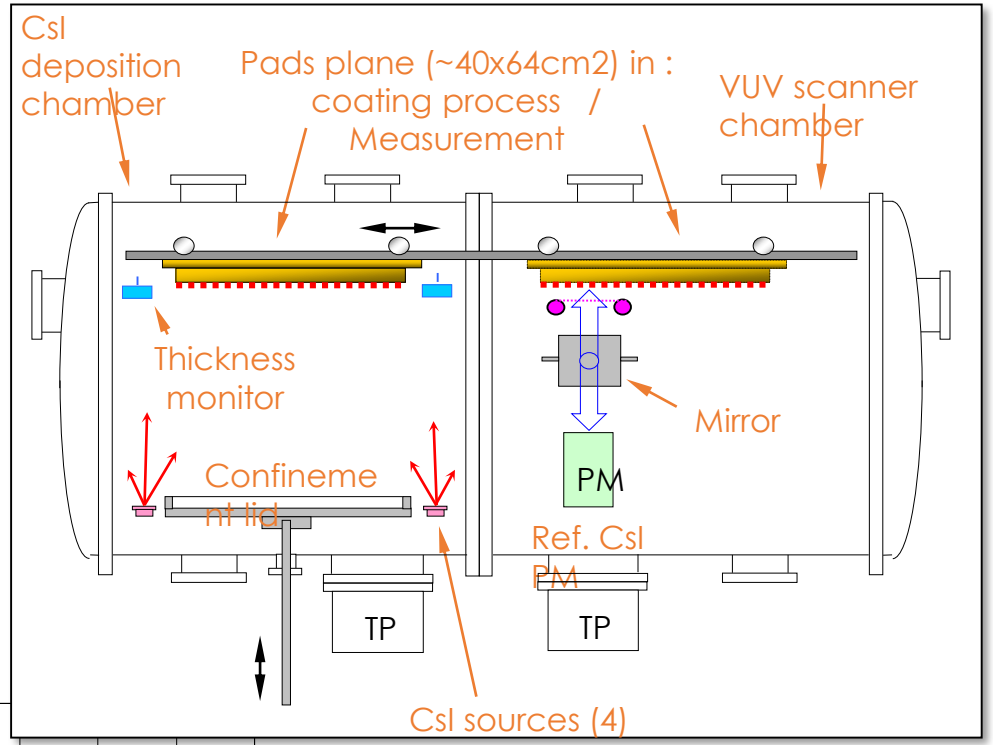


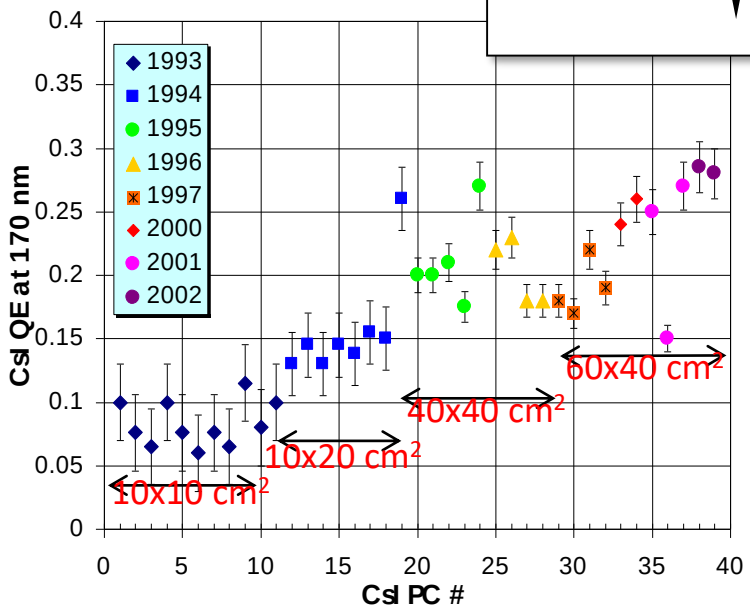
HMPID proto-2: 1st CsI-RICH operation in a collider experiment in 2000

1990-2002: the CsI-RICH age

The latest tool added for the CsI PC mass production:
VUV scanner for in-situ measurement after CsI-deposition

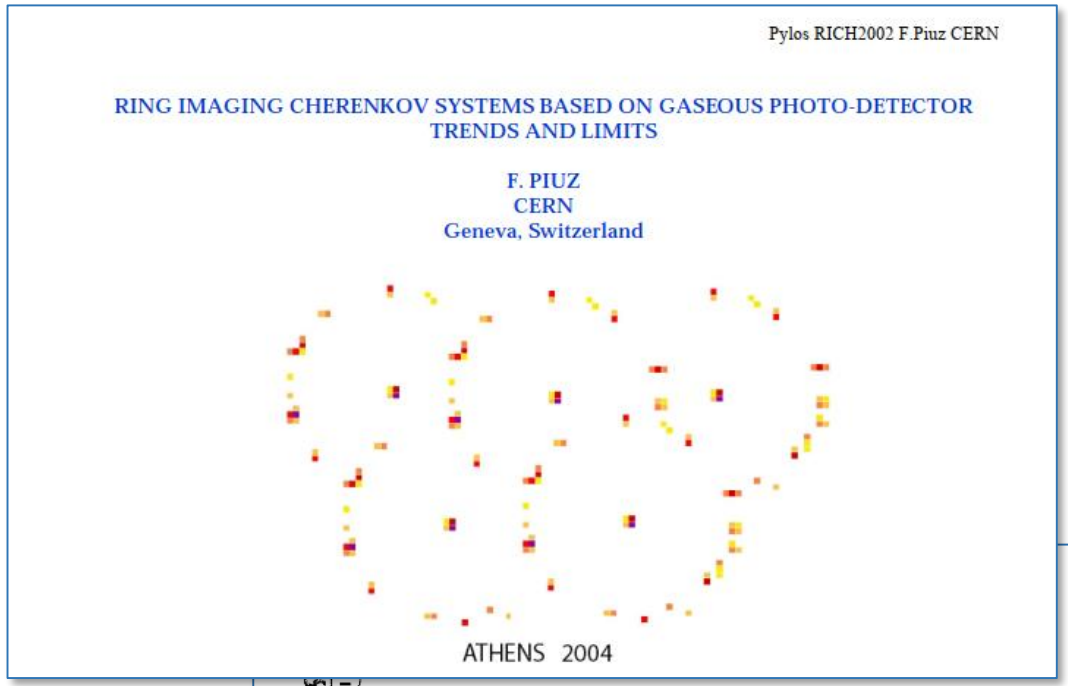


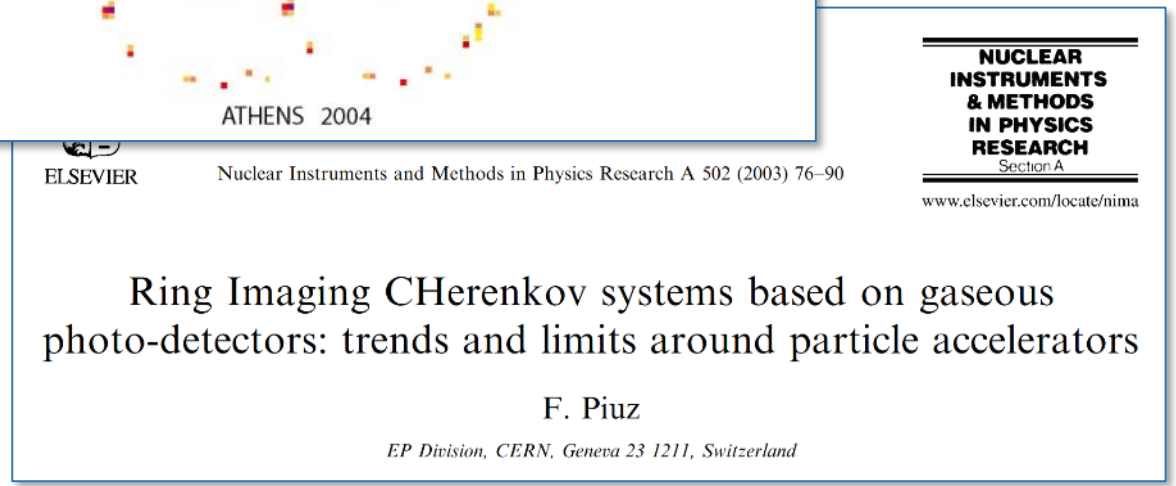


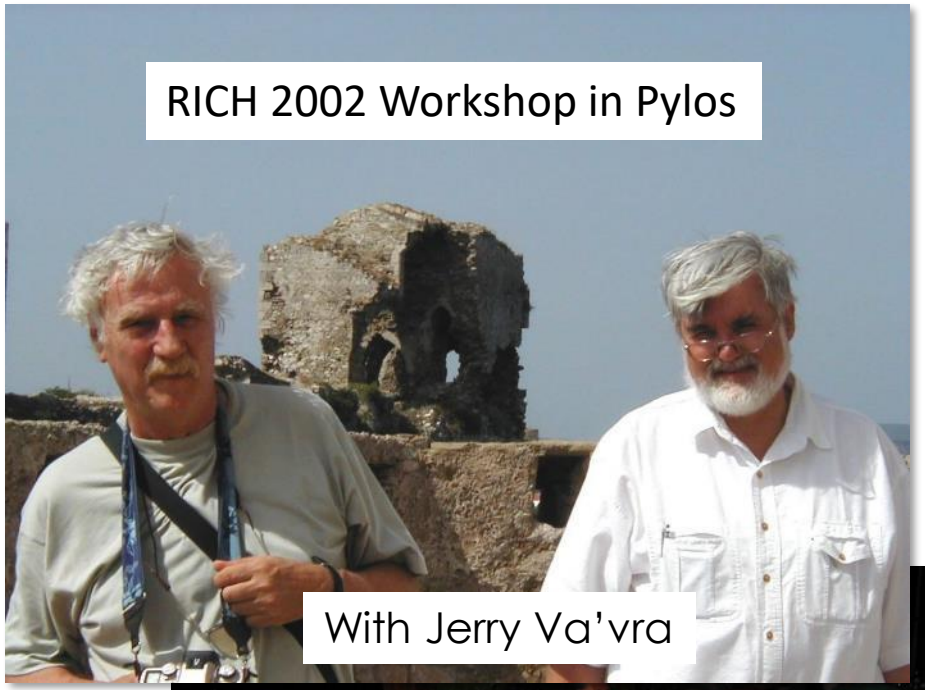


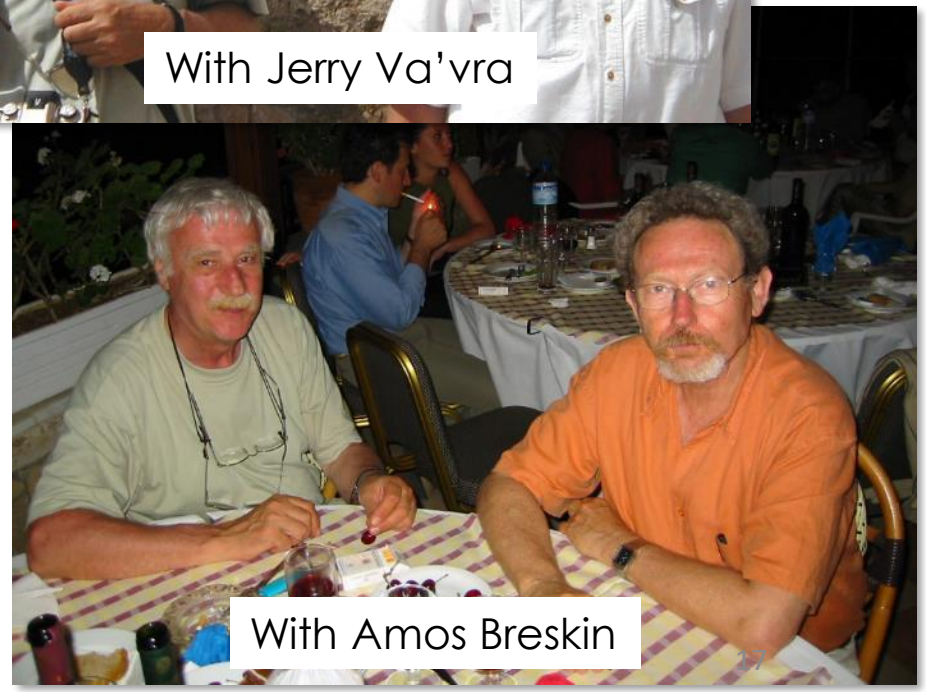
1990-2002: the CsI-RICH age

His last paper before retirement:
an outstanding review of CsI-RICH detectors



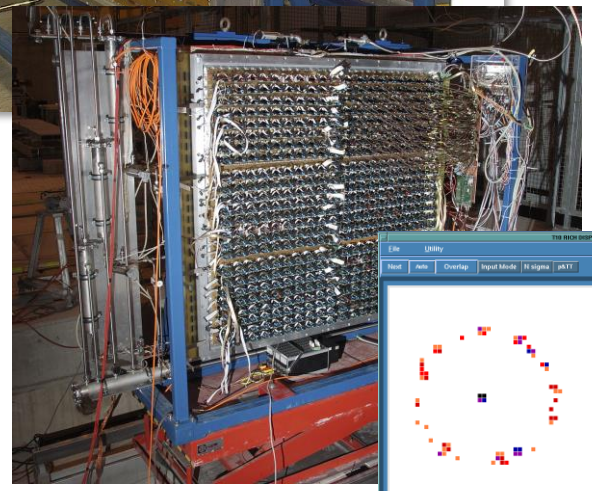


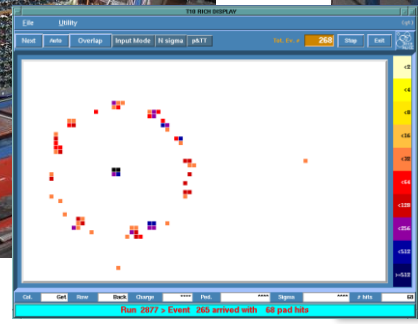




2003-2022: after retirement

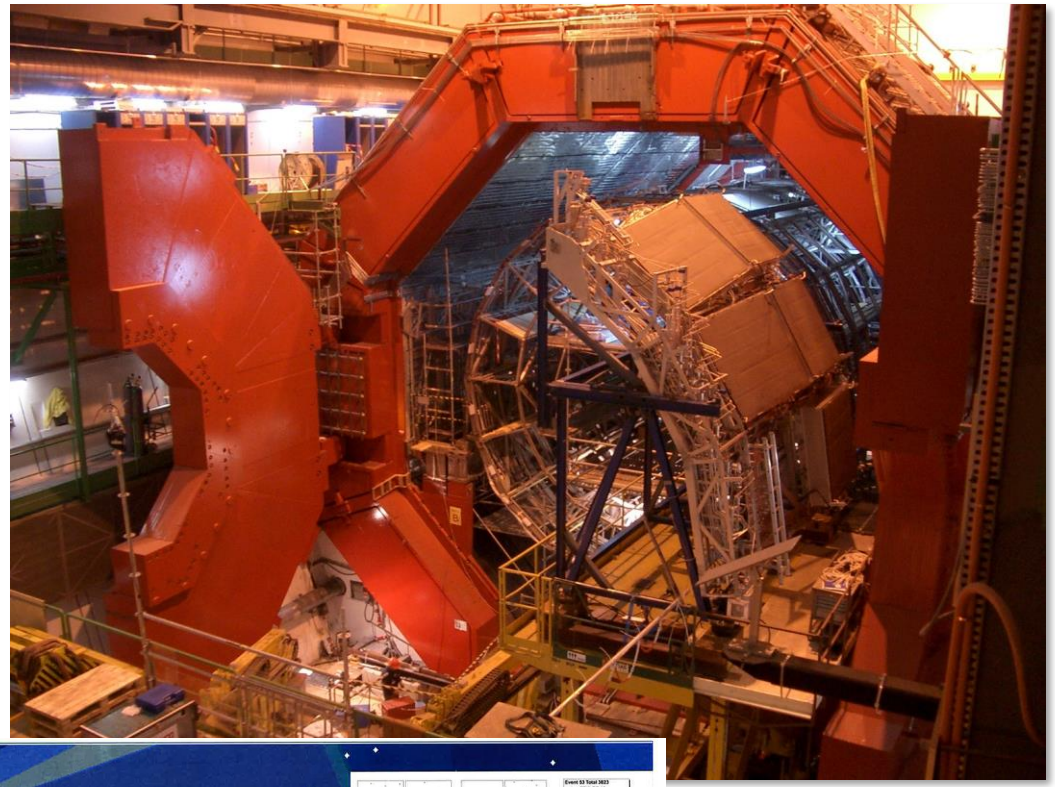
In 2001 we started the construction of the 10 m^2 HMPID RICH for ALICE. Francois continued to participate during all steps from module assembly, to validation in testbeam, to mounting on support cradle…

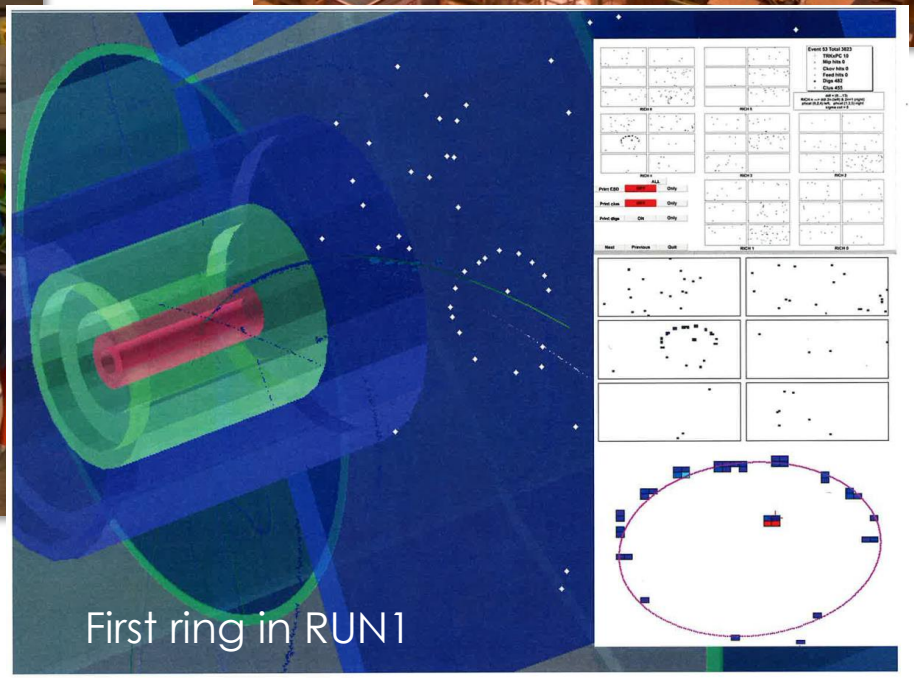




2003-2022: after retirement

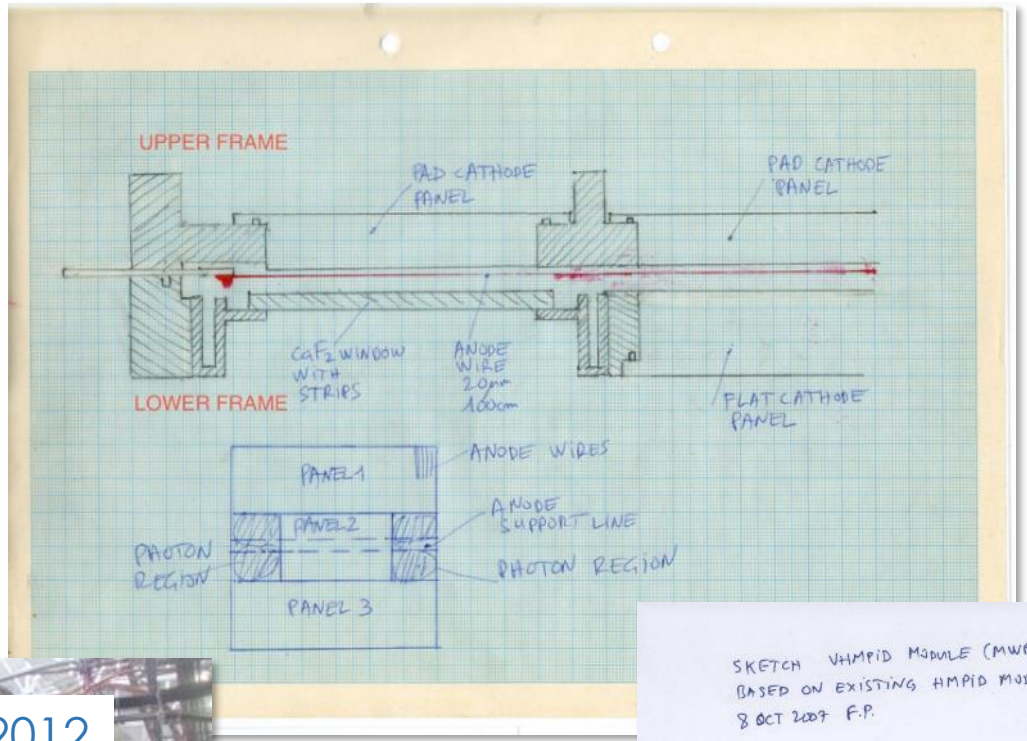
… until the final installation in September 2006. The detector is still up and running, taking data in RUN3.



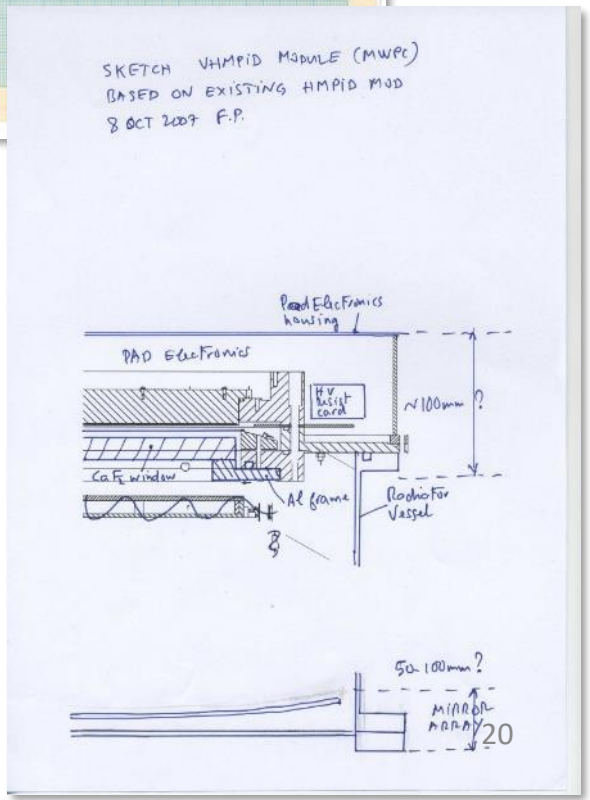


2003-2022: after retirement

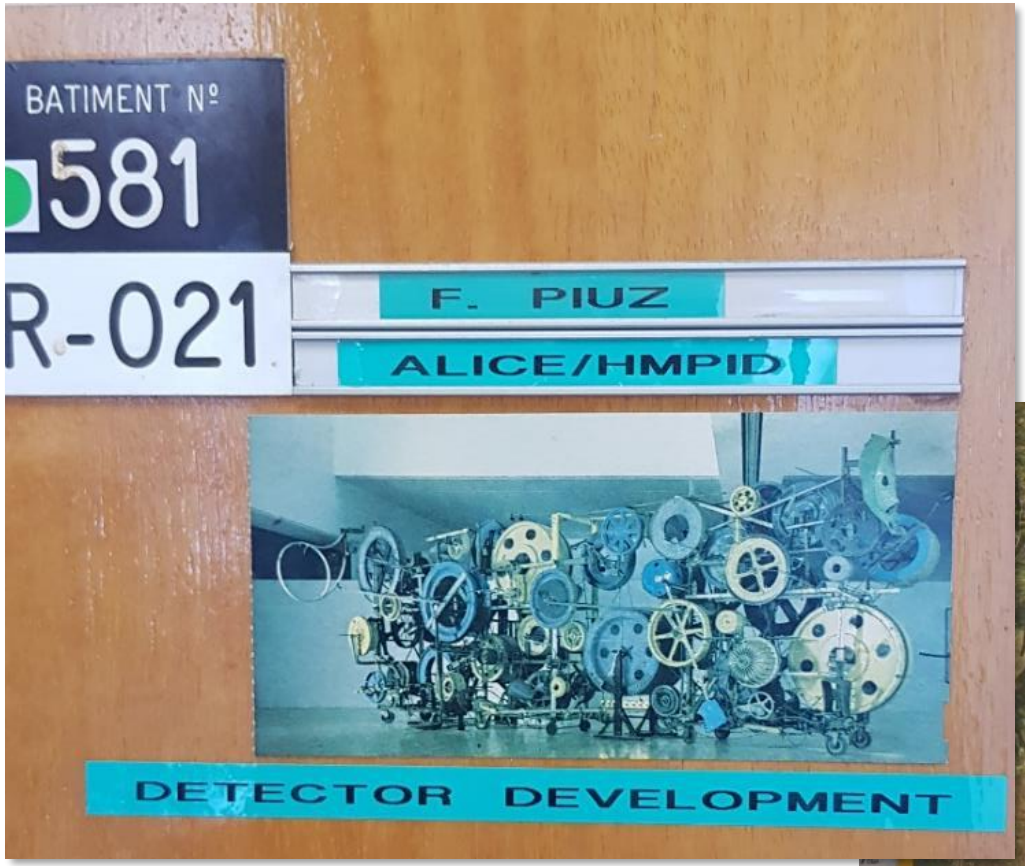
He further contributed to the VHMPID upgrade project, based on pressurized gaseous radiator and CsI PC

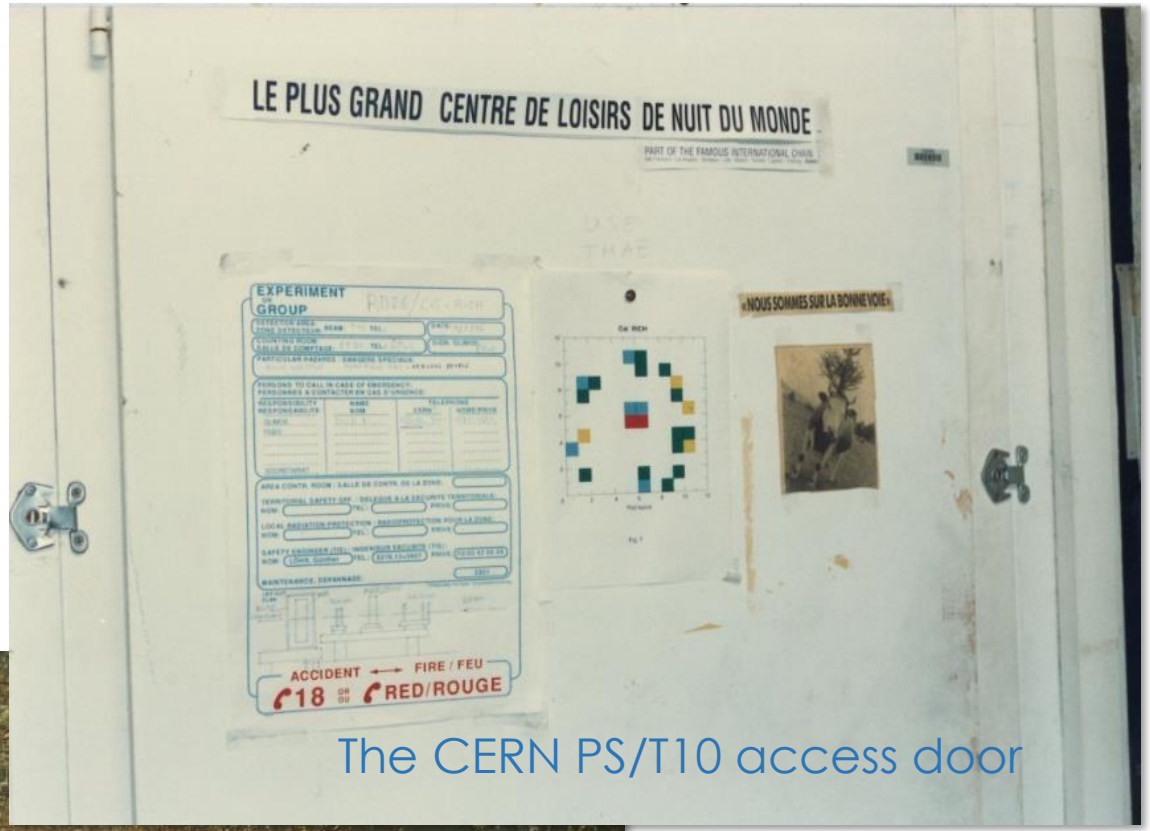


PS-T10 Aug 2012



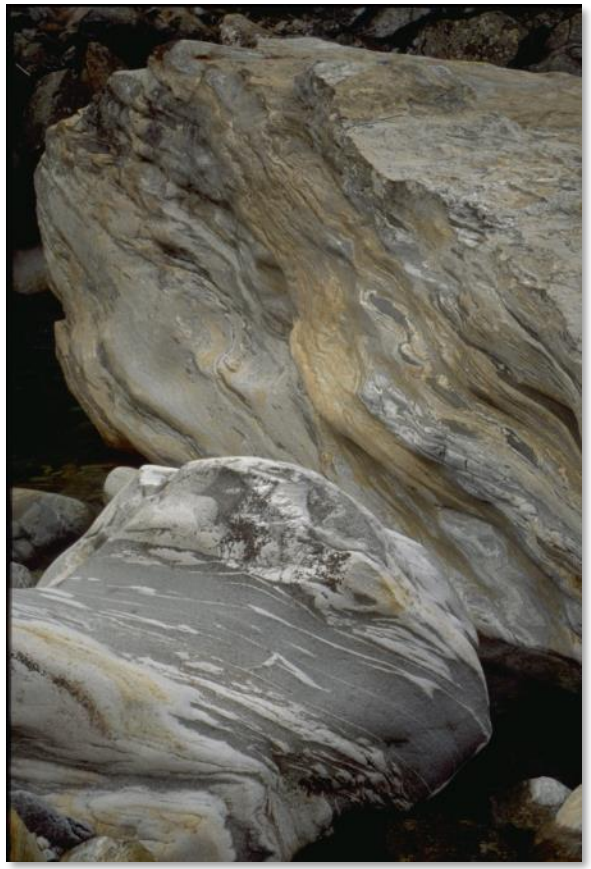
His sense of humour…



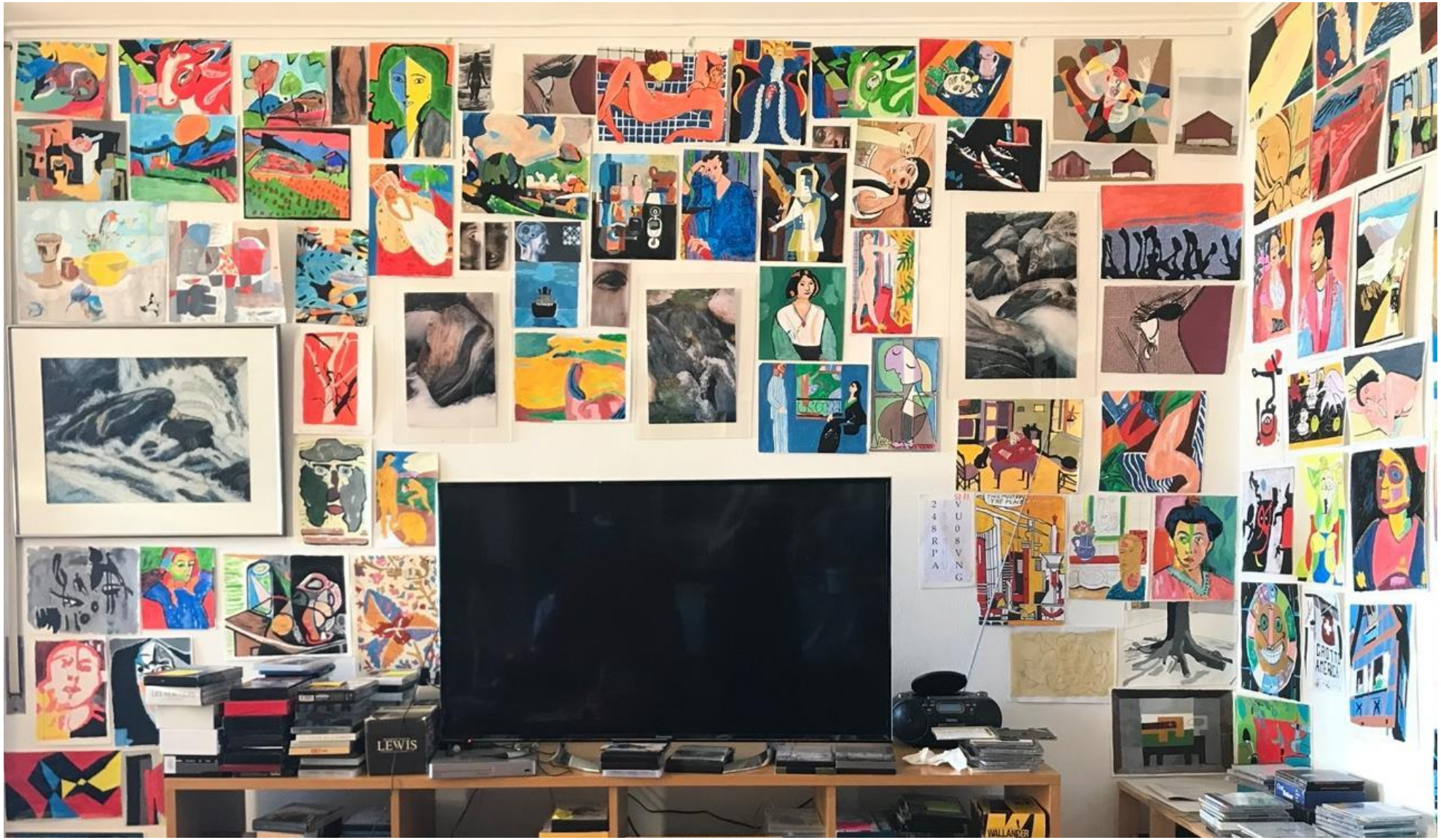


The CERN PS/T10 access door

His passion for photography



His passion for art



Francois was a brilliant and passionate physicist. His remarkable knowledge and ability to envision solutions to complex problems were key to the success of the many detector projects that he worked on. He was always interested in new ideas and ready to provide help and support to his colleagues. These qualities combined to a playful sense of humour made Francois a very friendly and charismatic personality.

During his outstanding career at CERN one of his main merits was the capability to transform breakthrough ideas and working principles into functional detector systems operated in experiments.

Jerry Va'vra:
"…But best part of Francois was his warm heart."