

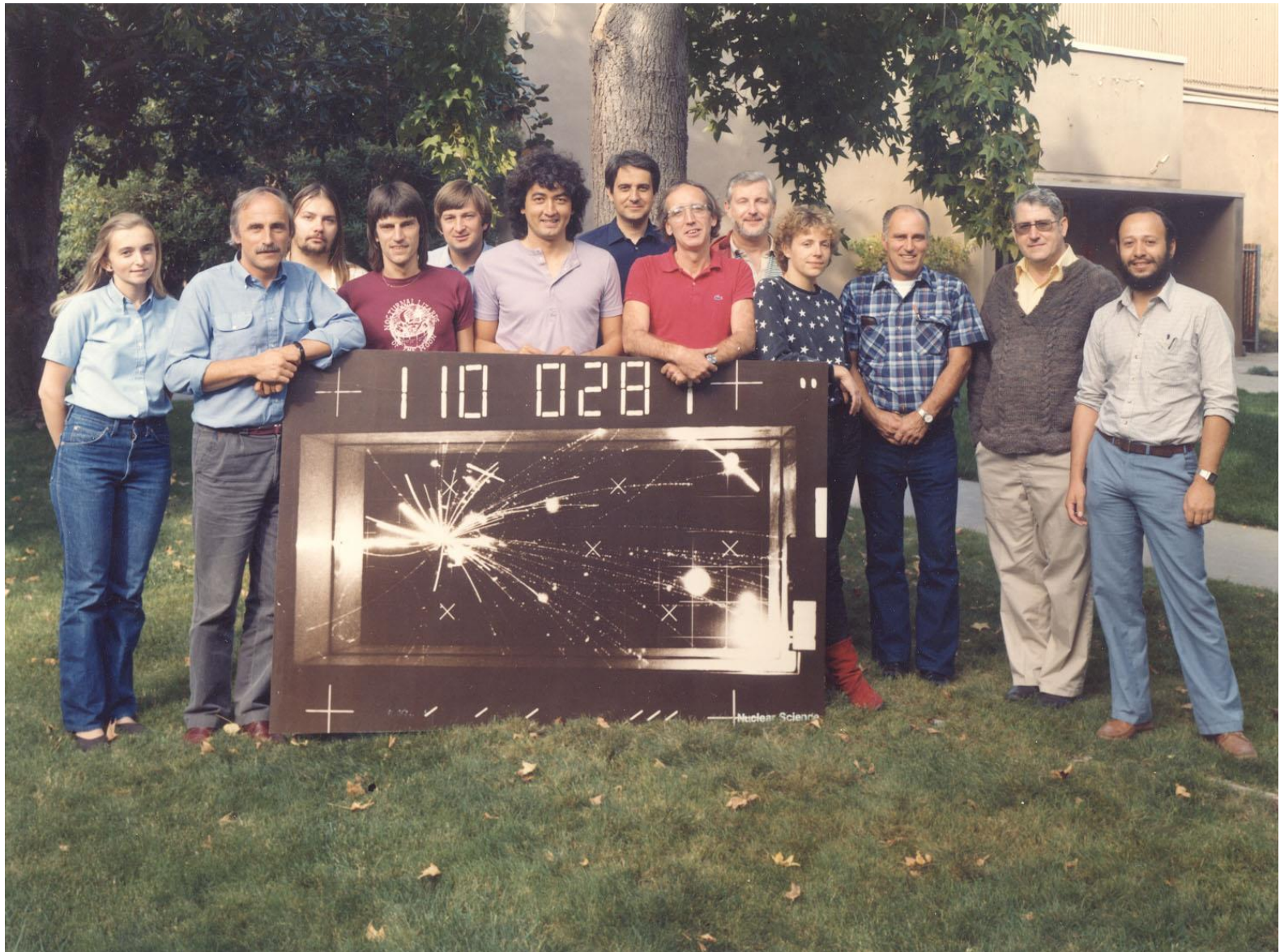
30 Years of Heavy Ions at CERN
9th Nov. 2016

The entry of Heavy-Ion physics at CERN

Reinhard Stock

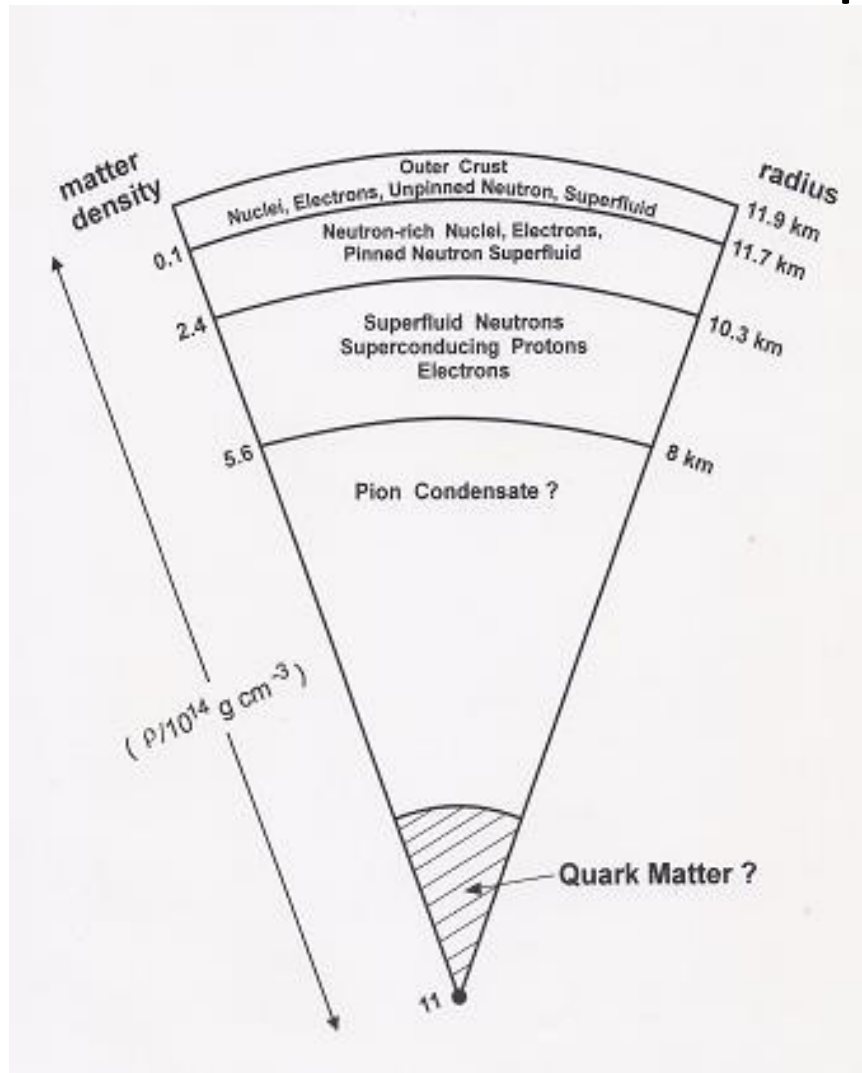


The Streamer Chamber Collaboration at LBL 1983



Early Goals

- The Nuclear Matter Equation of State (EOS)



Neutron Star radial
Structure late 1970`s

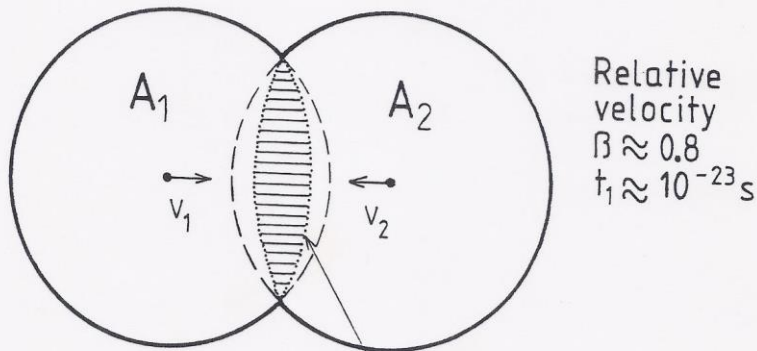
Supernova

Nuclear Compression Collisions

Hydrodynamic Model: Walter Greiner Frankfurt

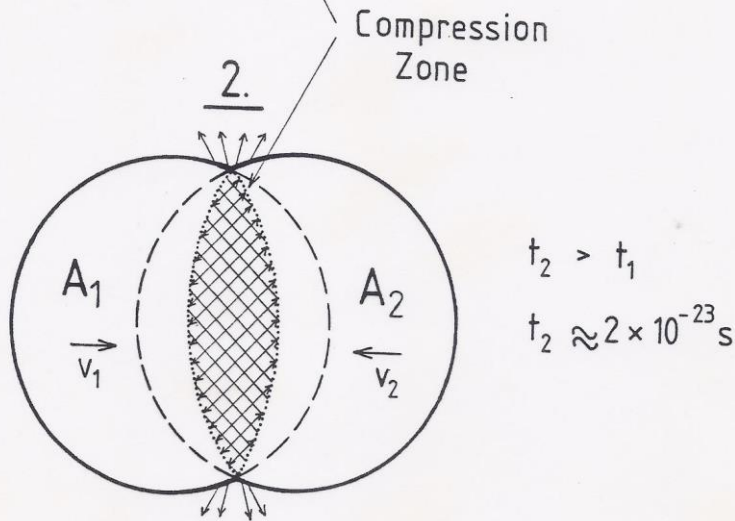
Shock Compression at Bevalac

1.



Relative velocity
 $\beta \approx 0.8$
 $t_1 \approx 10^{-23}$ s

2.

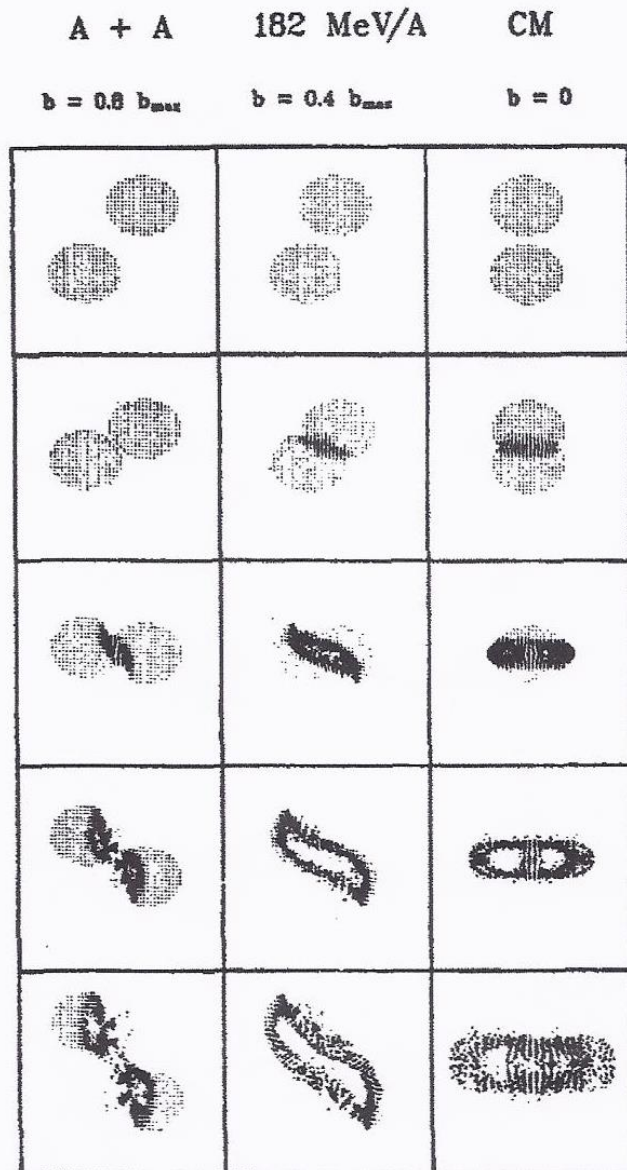


$t_2 > t_1$
 $t_2 \approx 2 \times 10^{-23}$ s

1974

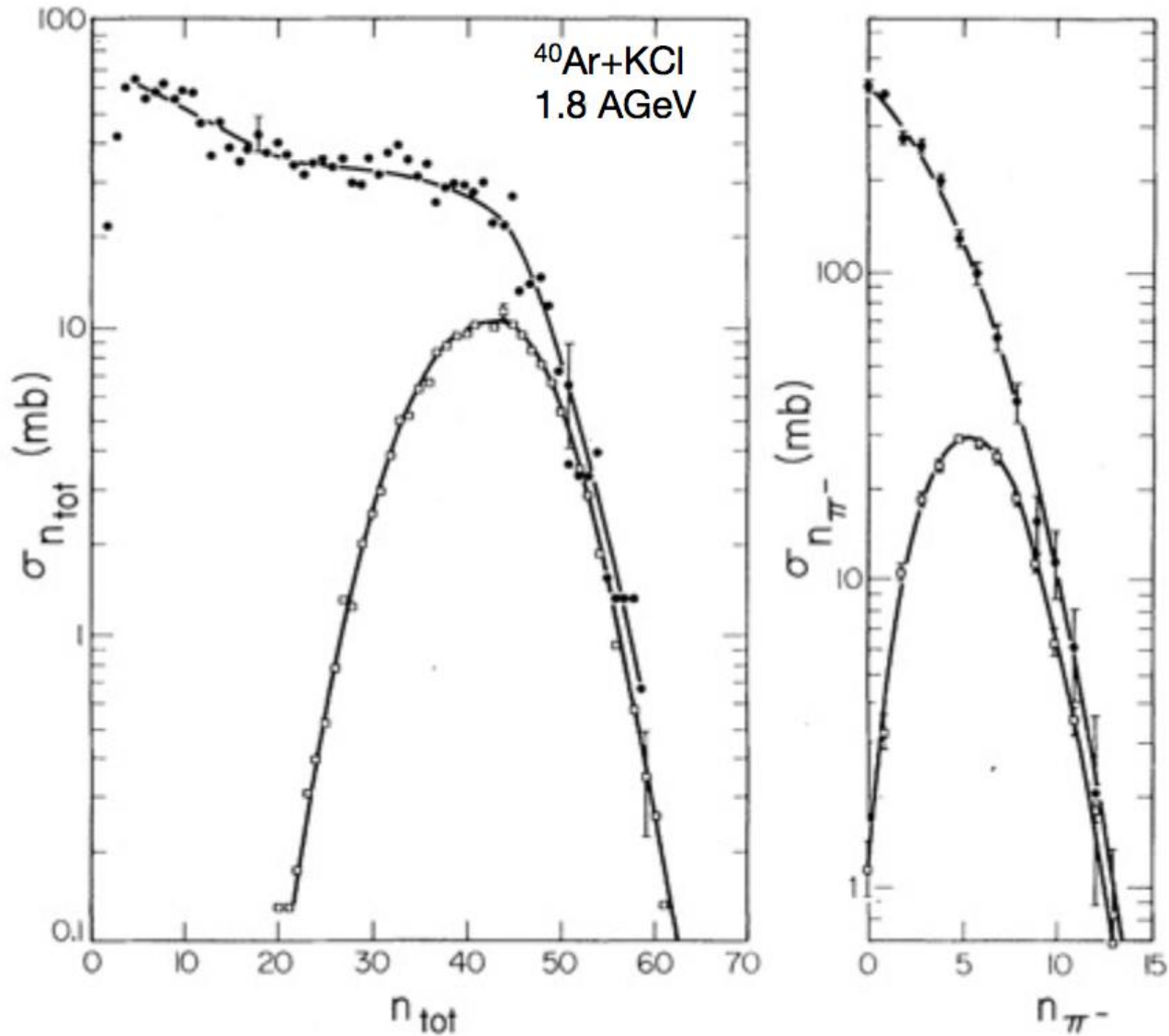
Central Collisions

Early Hydro Flow: 4π Detectors



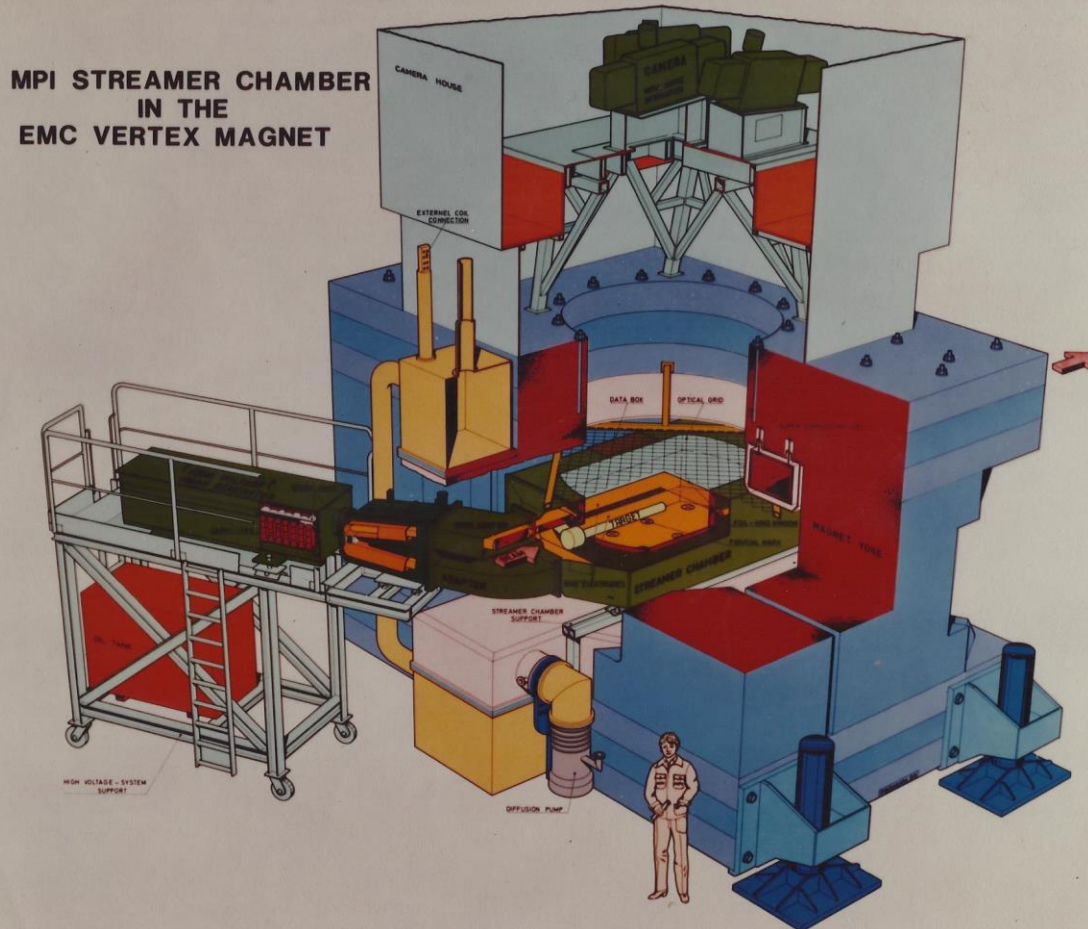
Sideward Flow in
semicentral Collisions

Historic Streamer Chamber Data



Phys. Rev. Lett. 45 (1980) 874

Meeting Volker Eckardt at LBL in 1981 „employ CERN NA5, NA24“



The
later
NA35

The 1982 Proposal

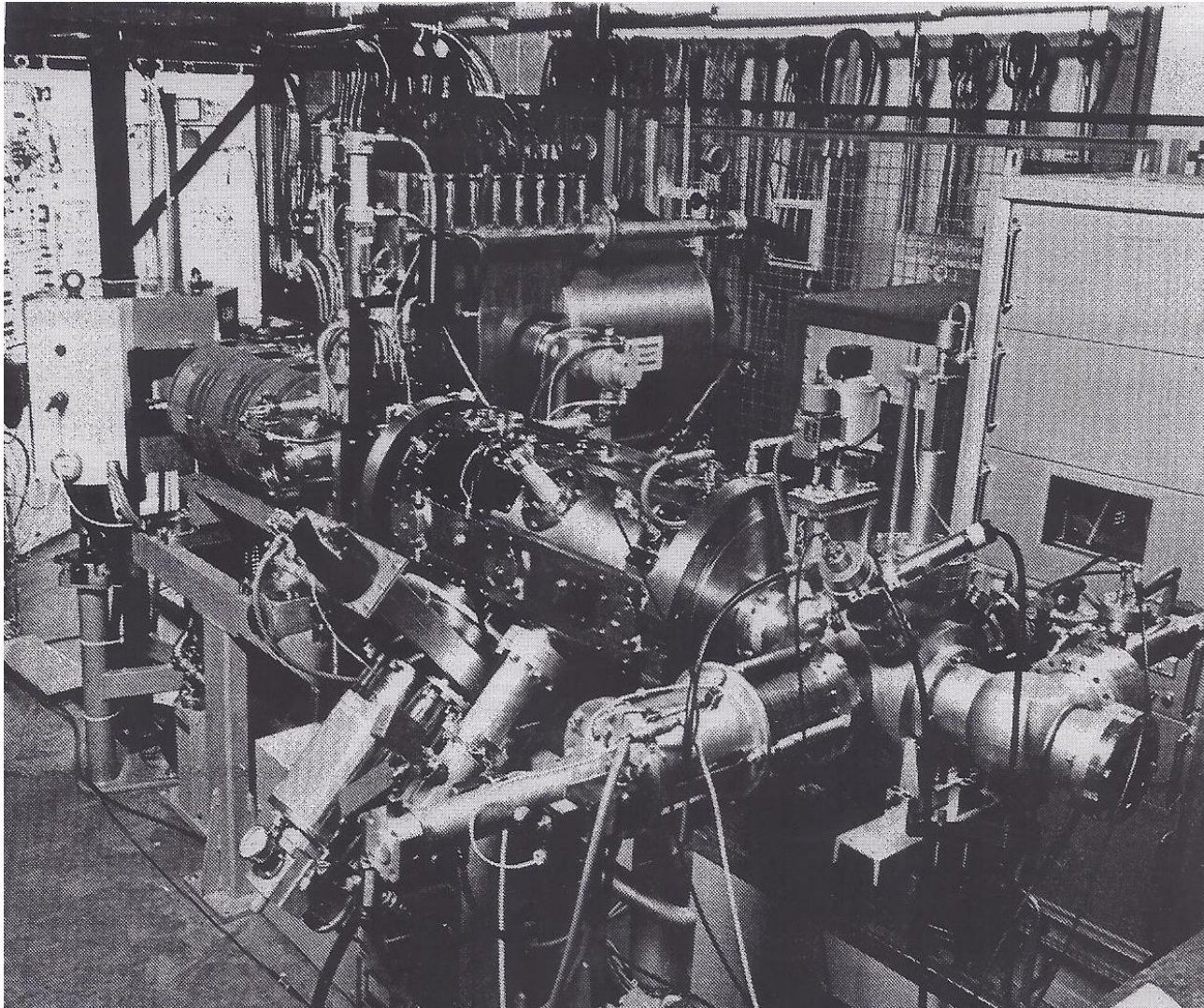
STUDY OF RELATIVISTIC NUCLEUS-NUCLEUS REACTIONS INDUCED
BY ^{16}O BEAMS OF 9-13 GEV PER NUCLEON AT THE CERN PS

Proposal submitted to the CERN PSCC by the
GSI¹-LBL²-Heidelberg³-Marburg⁴-Warsaw⁵-Collaboration

February 1982

N. Angert¹, H. Białkowska⁵, R. Bock¹, H.H. Gutbrod¹, H. Harris¹,
M.R. Maier⁴, A.M. Poskanzer², F. Pühlhofer⁴, H.G. Pugh²,
R.E. Renfordt³, H.G. Ritter¹, A. Sandoval¹, L.S. Schroeder²,
E. Skrzypczak⁵, R. Stock¹, H. Ströbele¹, R.Szwed⁵, A. Warwick¹,
F. Weik¹, H. Wiemann¹, K.L. Wolf²

The Gellert Grenoble ECR Source at GSI



Injector RFQ
from
Los Alamos

Fully stripped
Oxygen , later
Sulphur

Rudolf Bock at GSI



R. Stock & H.H. Gutbrod

at GSI



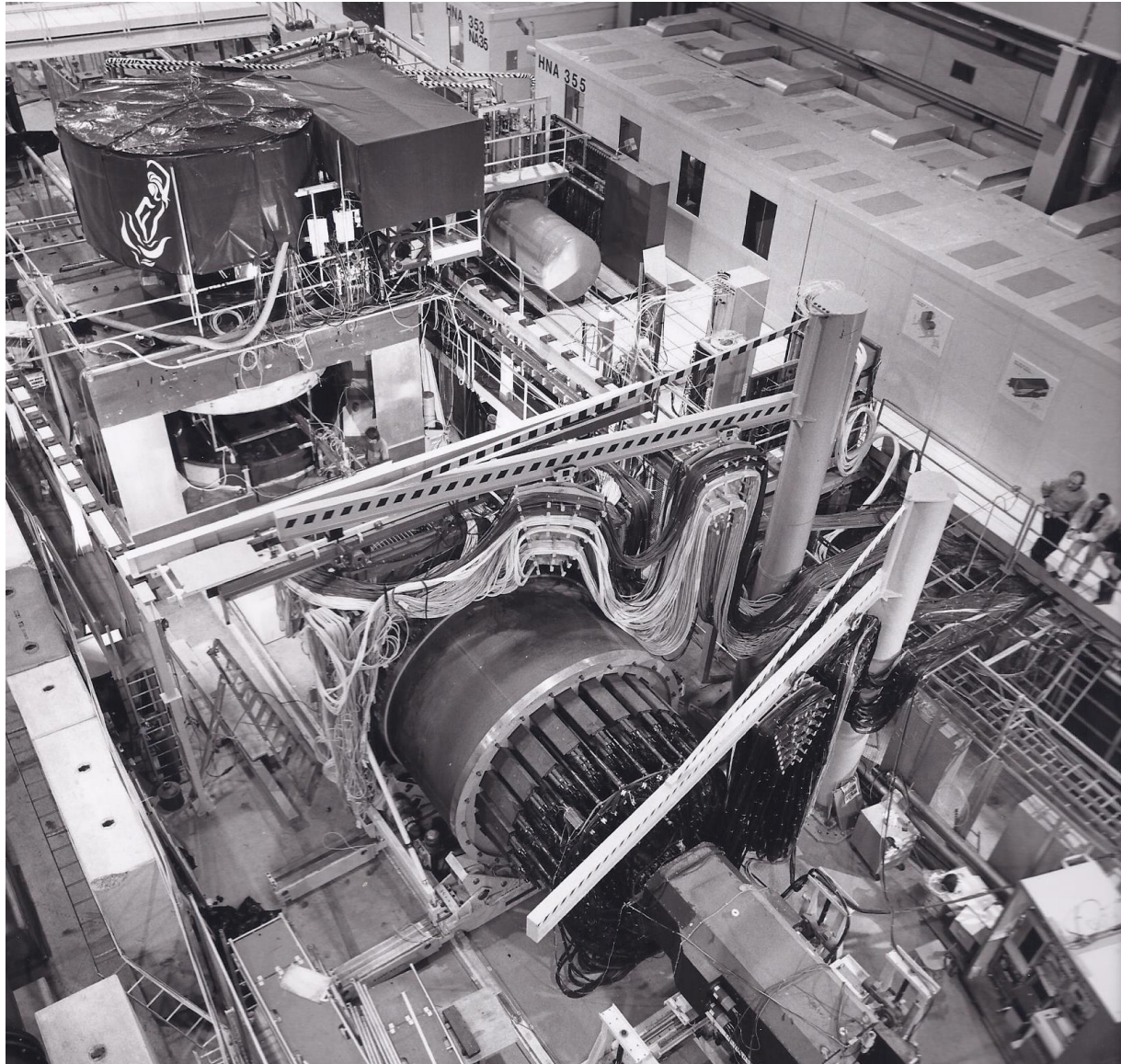
Convergence toward the SPS 1983

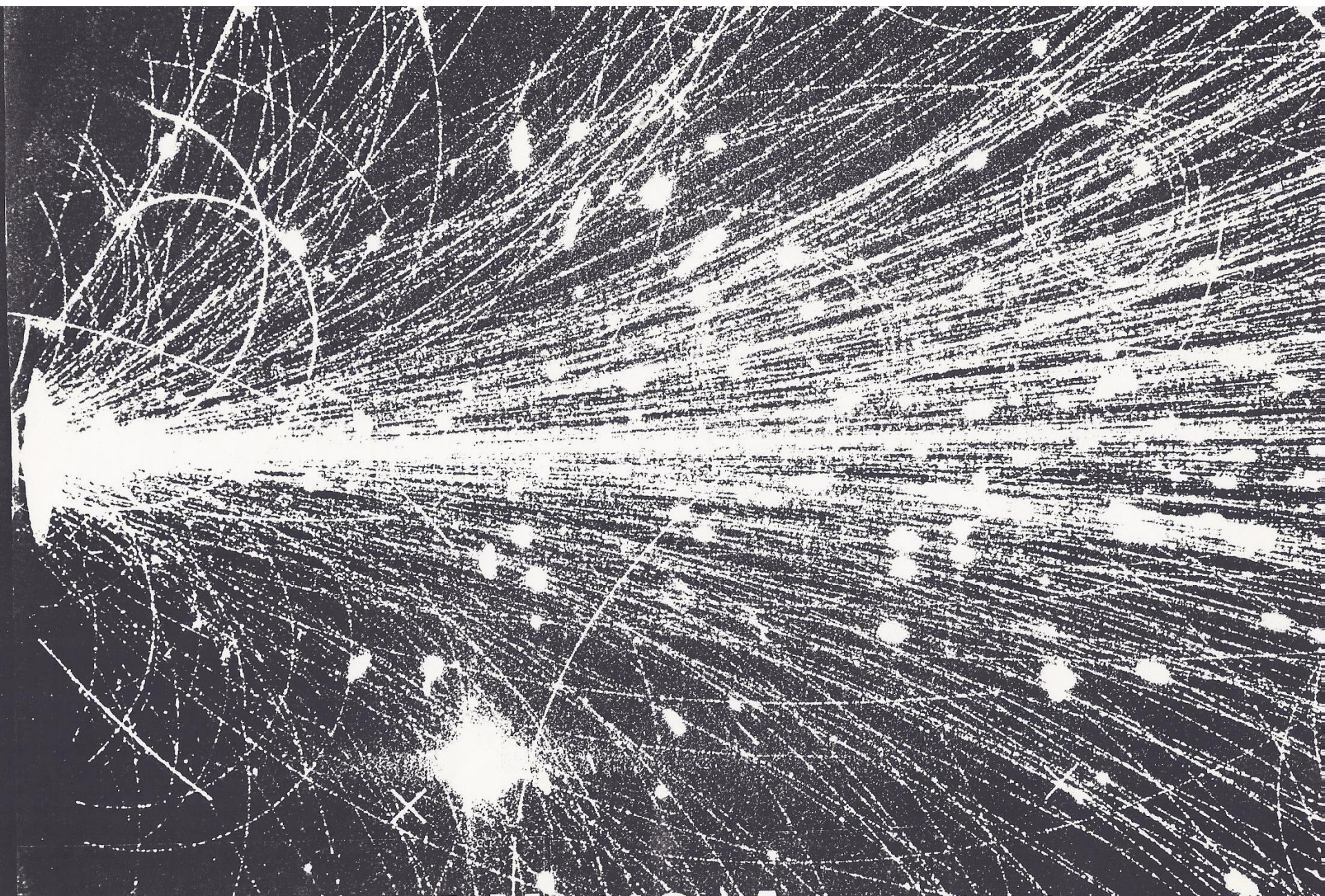
- Meeting Klaus Pretzl, MPI München → NA35
- Plastic Ball Collaboration growing with Lead-Glass Photon Calorimeter → WA80
- Convergence with CERN-Community
NA34, NA10, The Omega – Spectrometer
et all.

NA35 Collaboration at CERN SPS 1986



NA35





NA35 64 TeV $^{32}\text{S} + \text{Au}$

Toward Lead beams in the SPS 1986 onwards

HEAVY NUCLEAR BEAMS AT CERN

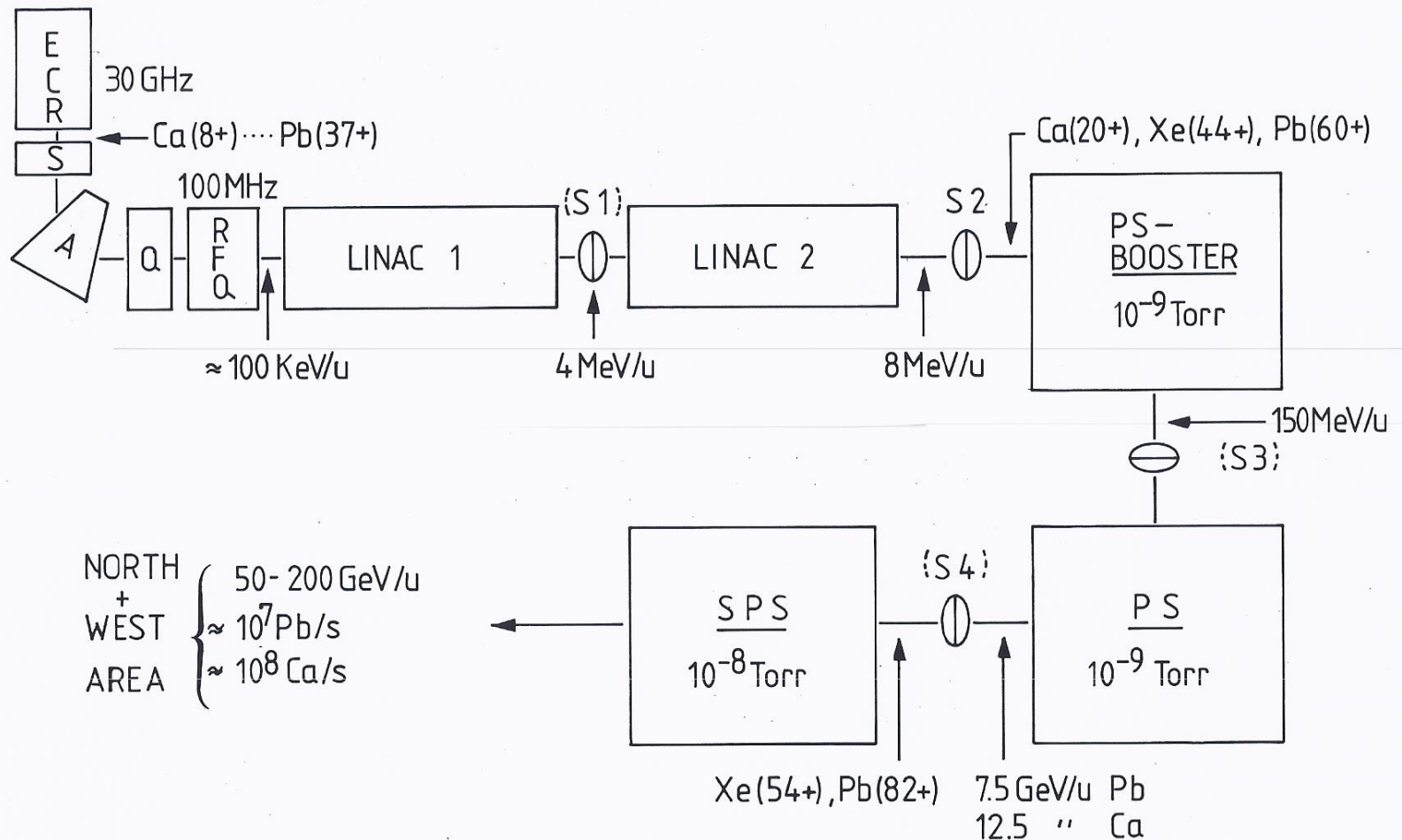
R. STOCK , FACHBEREICH PHYSIK , UNIV. FRANKFURT

R. BOCK , GSI DARMSTADT.

1986

Injector Constructions for the Pb Beam

Consultations with H. Haseroth and group



Entry of the European Nuclear Physics Community

- Lead Injector total cost ca. 32 MSF
- The crucial CERN meeting convened by Carlo Rubbia, with Dr. Schunck from BMFT
- Contributions „in kind“ from CERN and 8 european agencies

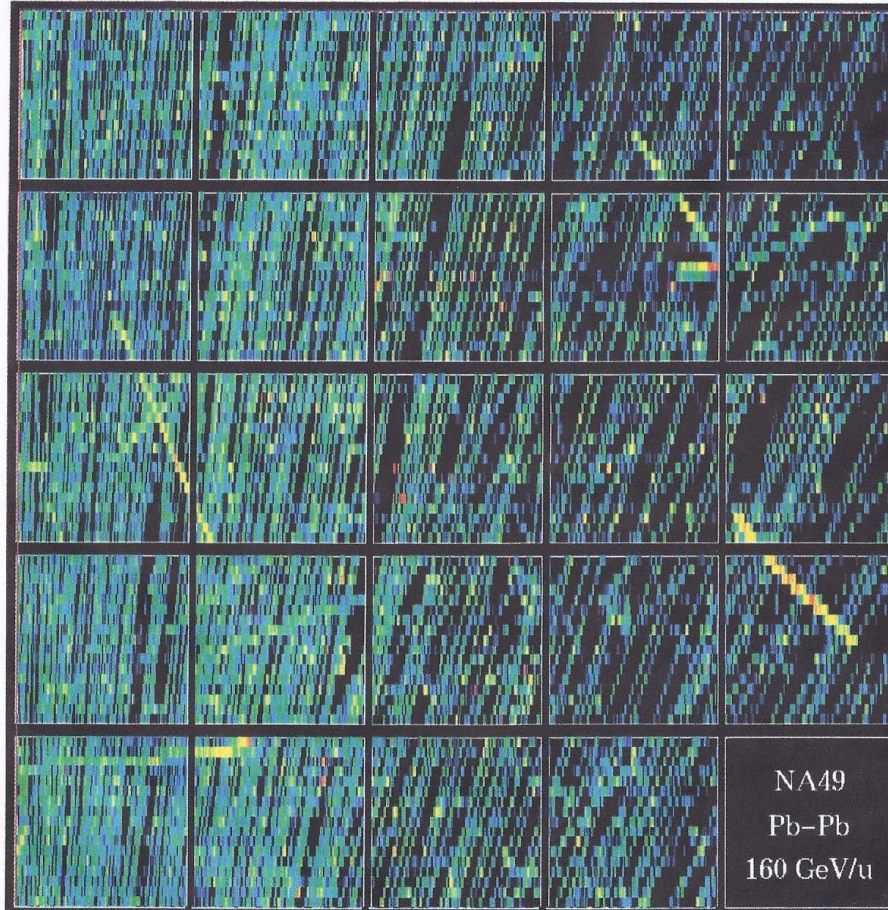
Entry of the TPC at CERN

- Volker Eckardt MPI München: ALEPH TPC experience and tools at MPI
- H.G. Fischer CERN , Field Cages
- Berkley Front End Electronics
- S. Kleinfelder at LBL „switch capacitor array“ from EOS TPC at LBL

Howel Pugh



TPC Tracking



- Total charged particle multiplicity about 1000
- inner segment of TPC drift volume

Data rate from NA49 to ALICE: Factor > 1000 !

New CERN style, late 1990's

- Pierre Darriulat
- CERN Memorandum of Understanding:
Challenge to Nuclear Physics Community
funding (3 years periods)
- Dr. Schunck BMBF „Verbundforschung“
University groups at CERN
FRA,MR,DA,MÜ,HD,FR plus GSI and MPI