SQM 2016 Berkeley

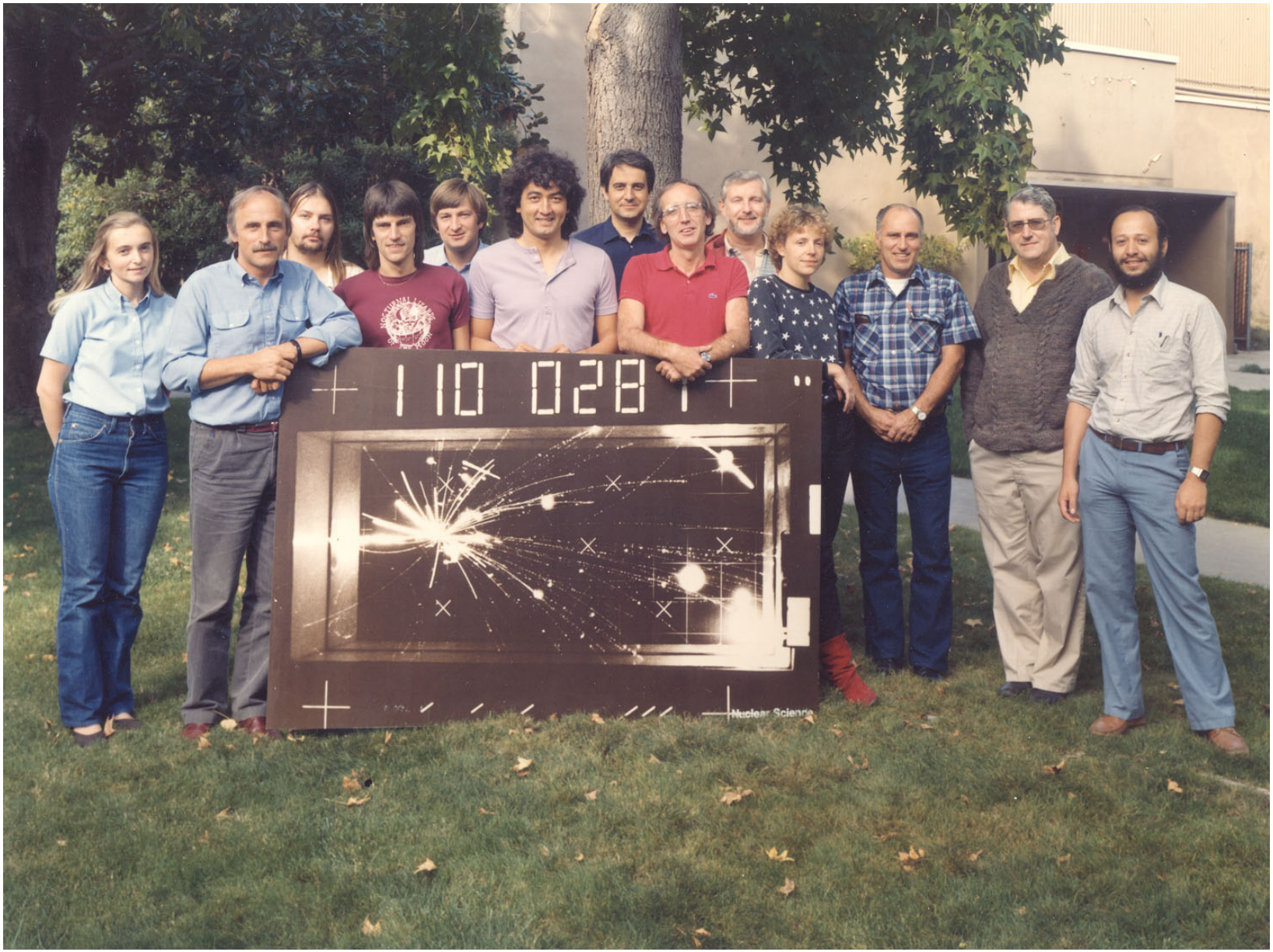
Pioneering Years: with Grazyna Odyniec at the Bevalac and SPS

Reinhard Stock

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

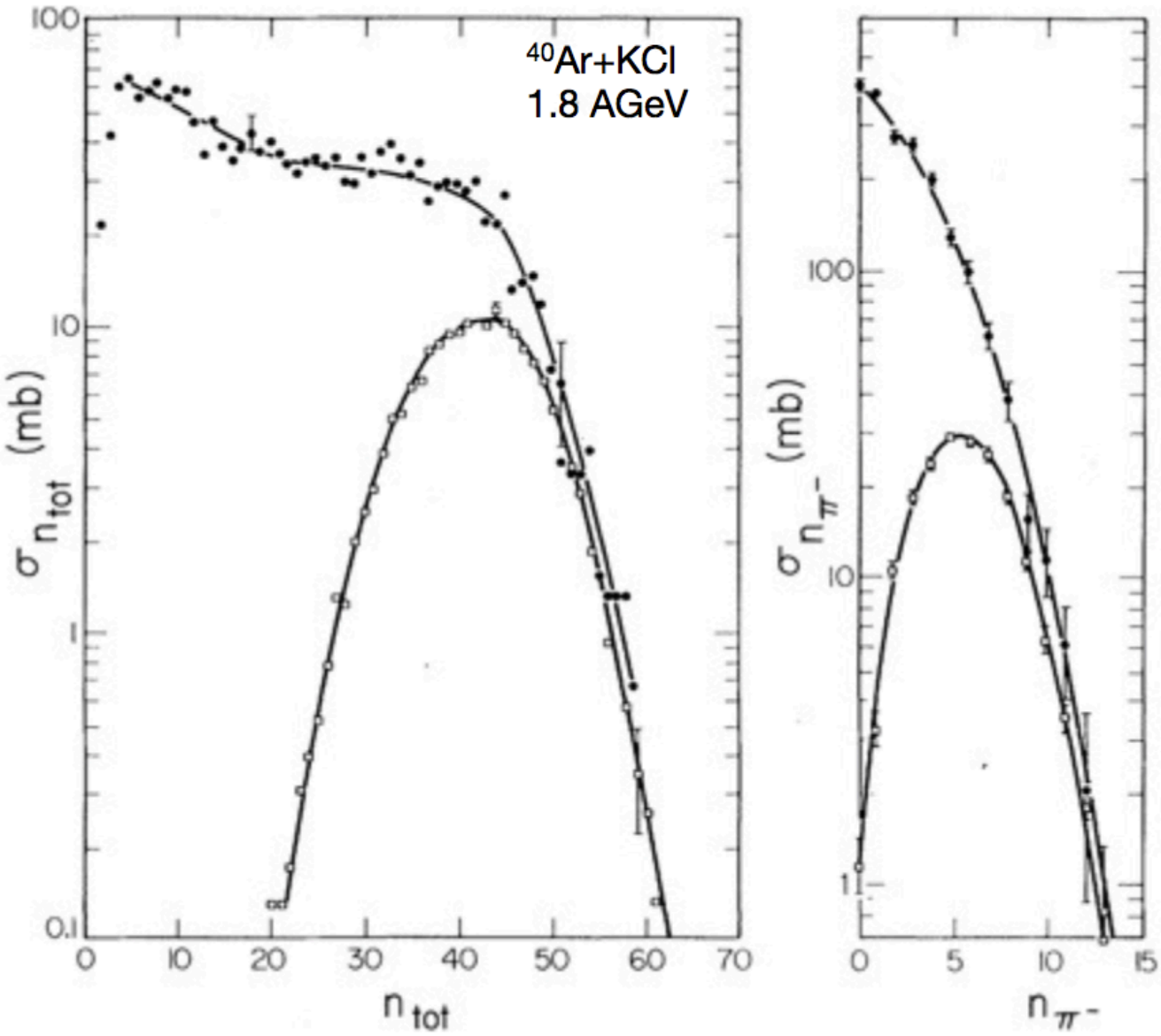
FIAS Frankfurt Institute for Advanced Studies

The Streamer Chamber Collaboration at LBL 1983

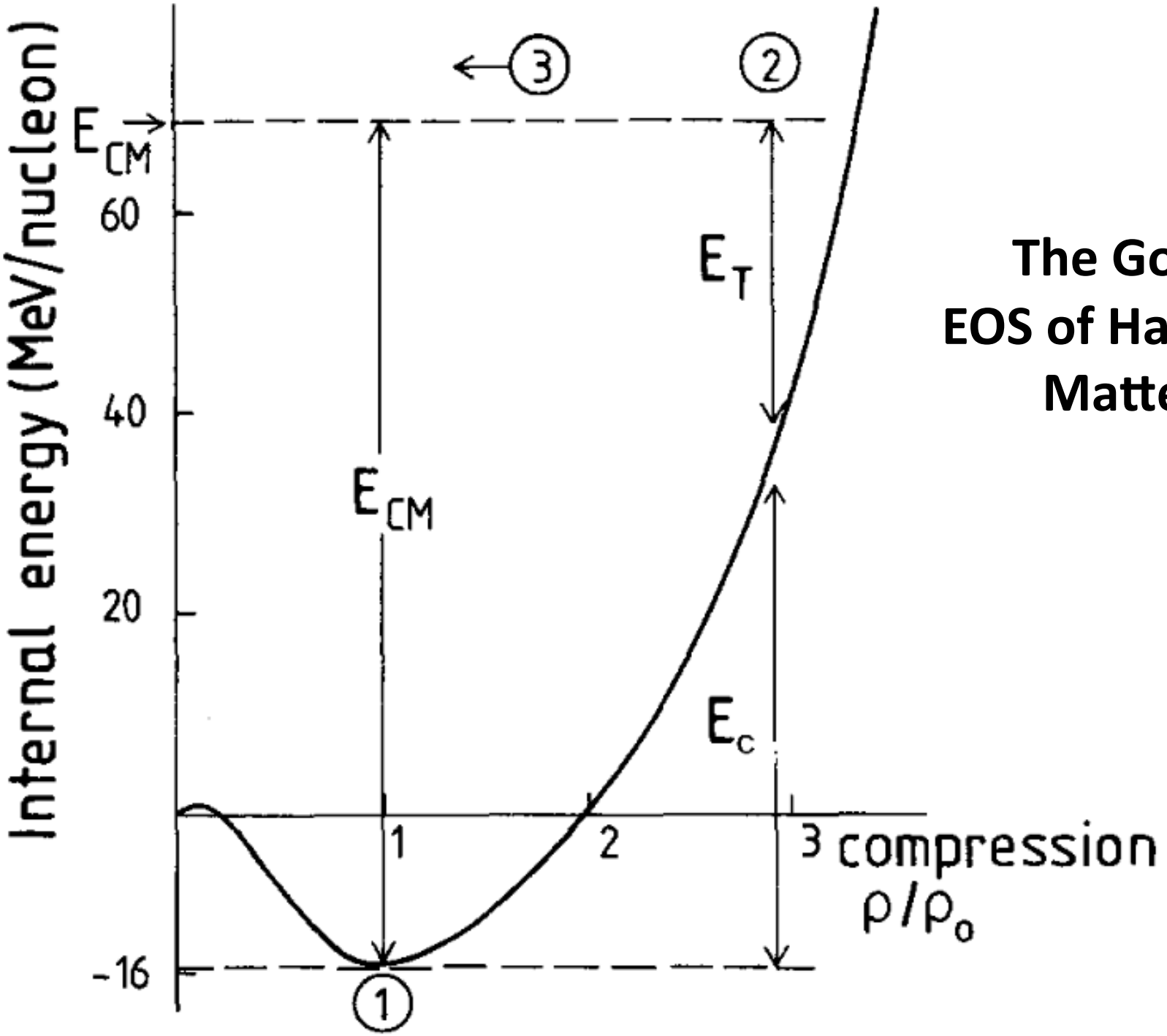


NA35 Collaboration at CERN SPS 1986

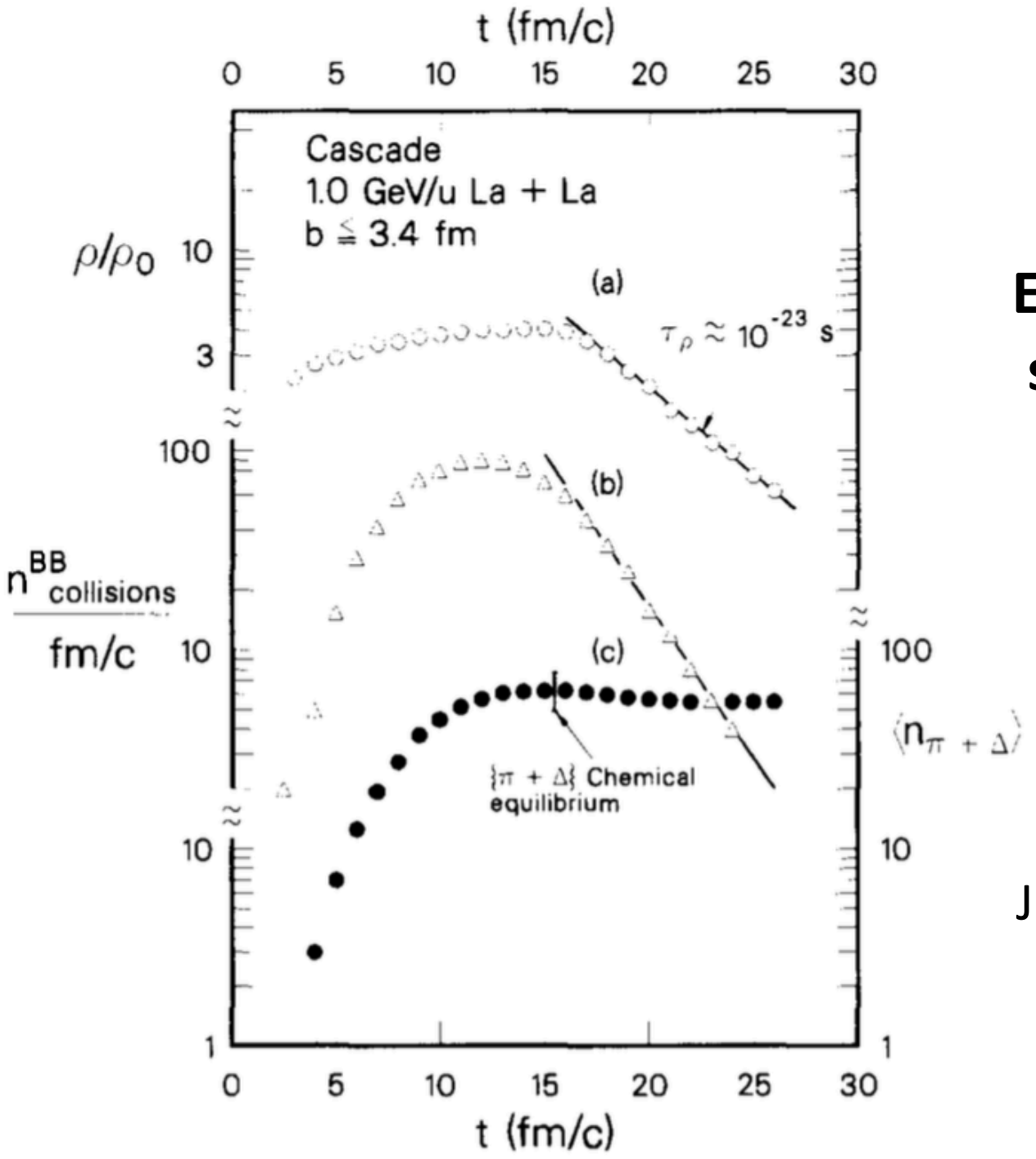
Historic Streamer Chamber Data



Phys. Rev. Lett. 45 (1980) 874



The Goal:
EOS of Hadronic Matter

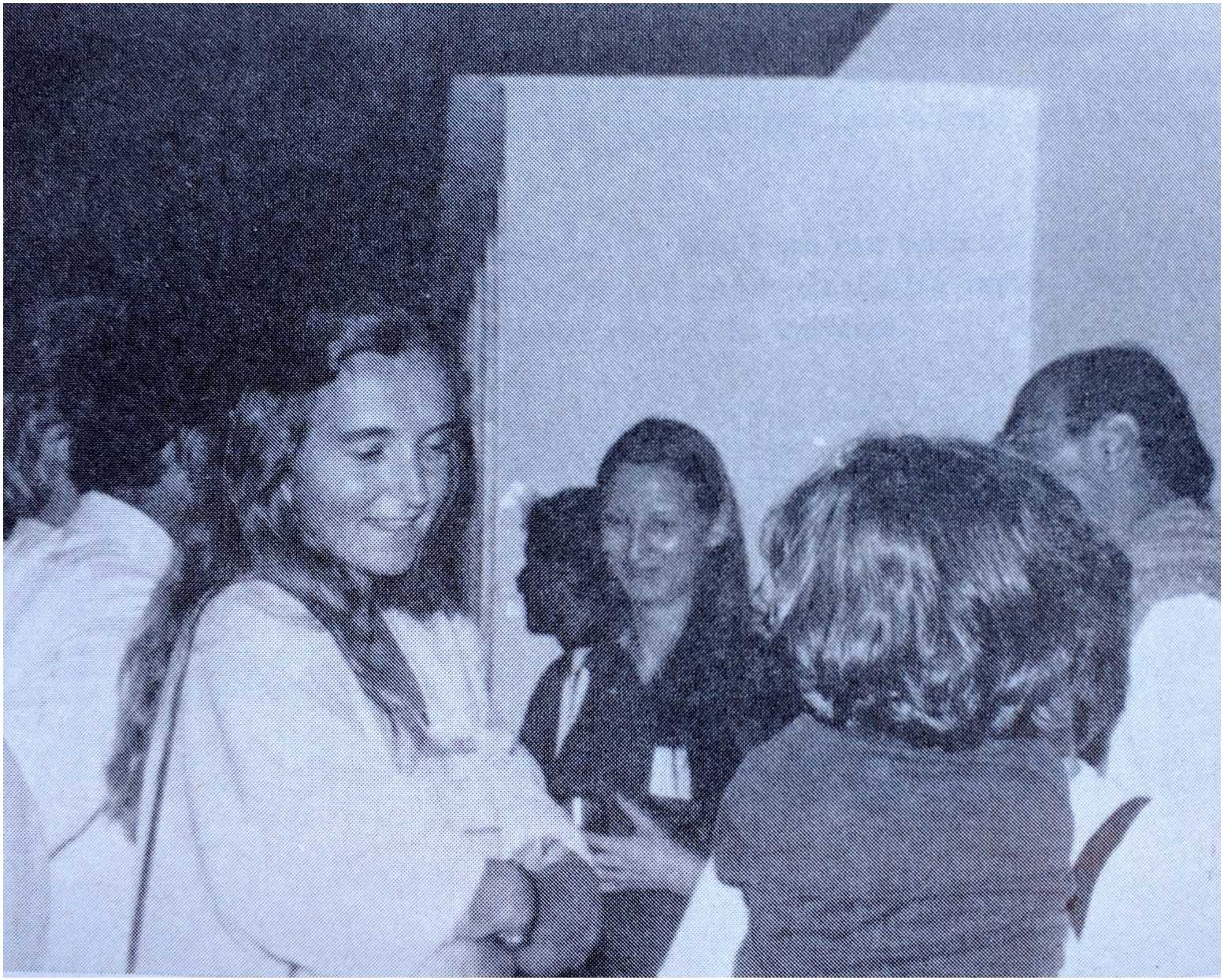


EOS Observables: sensivity to high density stage

J. W. Harris & R. Stock

Notas de Fisica (1984)

Grazyna at Rio de Janeiro 1993



Grazyna at Rio de Janeiro 1997

Howel Pugh

VENUS

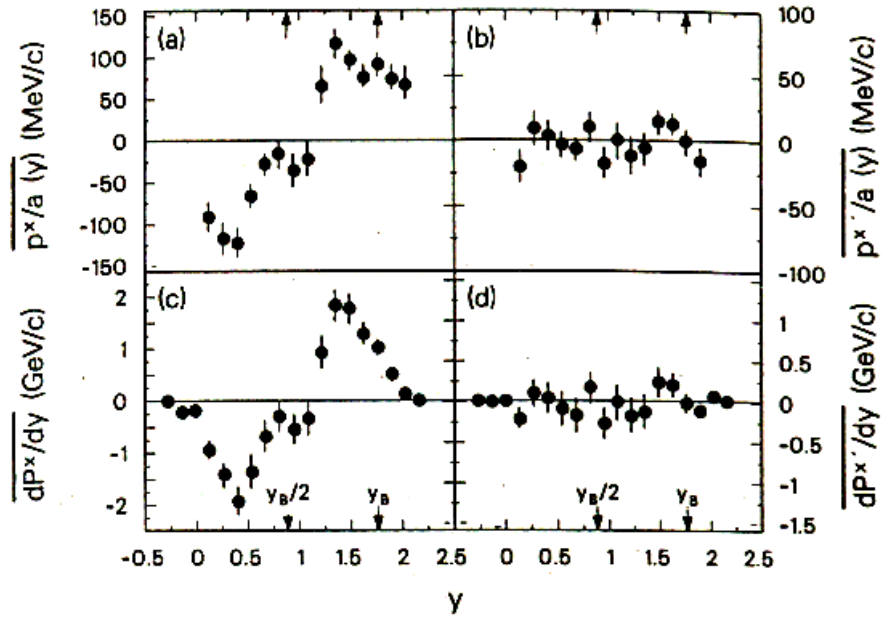
A PROPOSAL FOR A
RELATIVISTIC ION SYNCHROTRON & STORAGE RING

5 25 79 MBD WCH

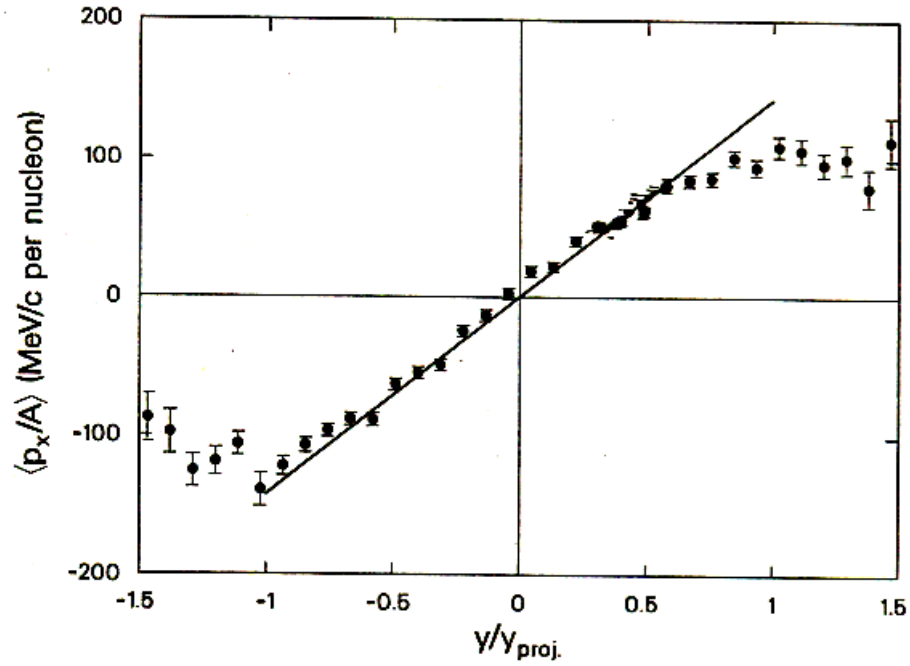
Transverse Momentum Balancing
P. Danielewicz and G. Odyniec, Phys. Lett 157B (1983) 146

EOS Observables: directed Flow (v_1)

Ar + KCl
Str.Ch.



La + La
Pl. Ball



K.G.R. Doss et al
PRL 57 (1986) 302

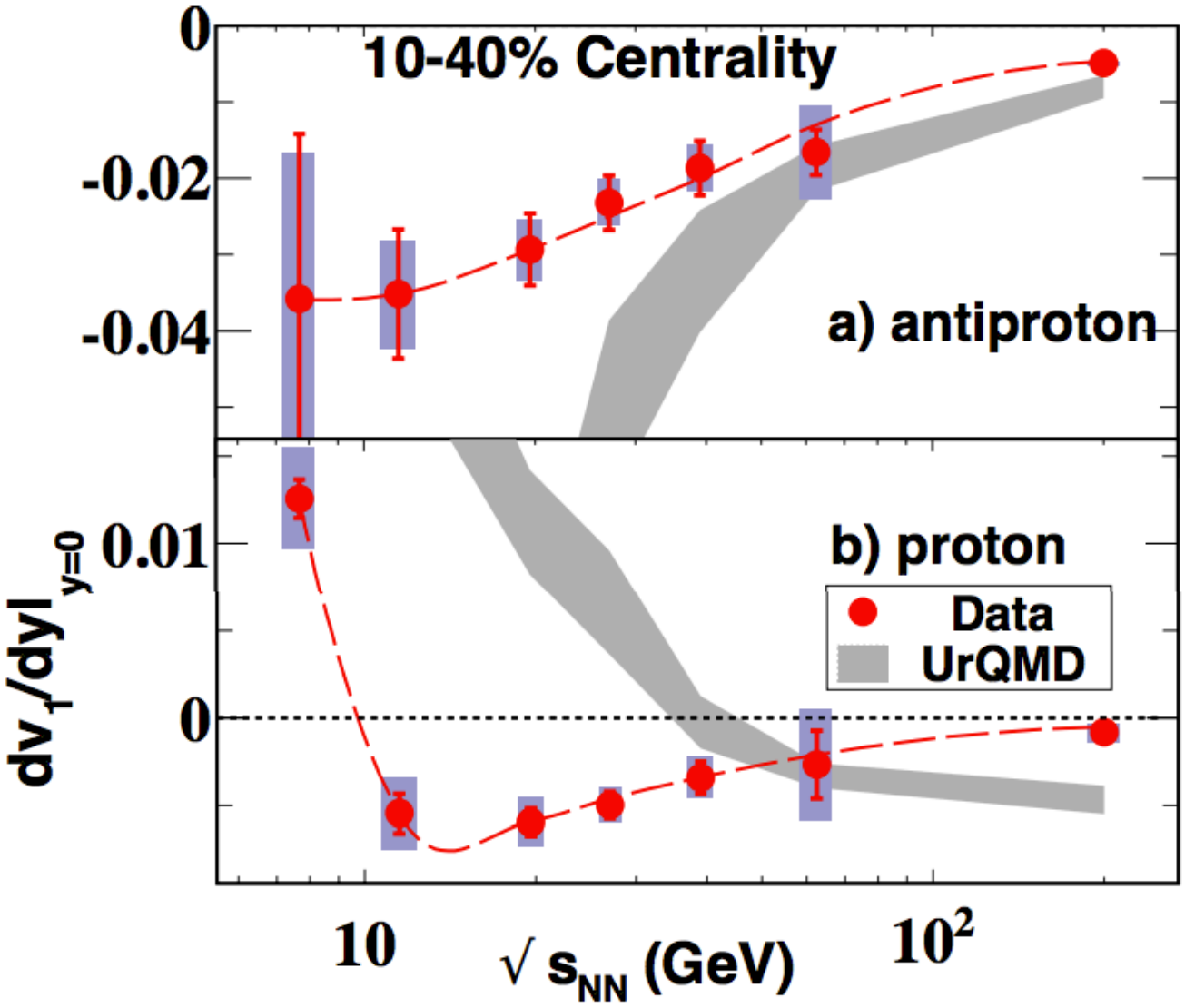
EOS from Sideflow Data

$$F(y) = P_{eff} \times S \times t_{pass}$$

EOS

A long story since 1989!

Softest Point of the EOS



H. Stöcker 2005

STAR
PRL 112 (2014) 162301

EOS in Neutron Stars
Oppenheimer, Volkoff, Tolman 1938

Hydrostatic equilibrium:
The inward pressure by gravity of each sphere-shell at radius R is counterbalanced by the EOS-compressional counter-force of the enclosed interior

Constraining the nuclear matter equation of state around twice saturation density

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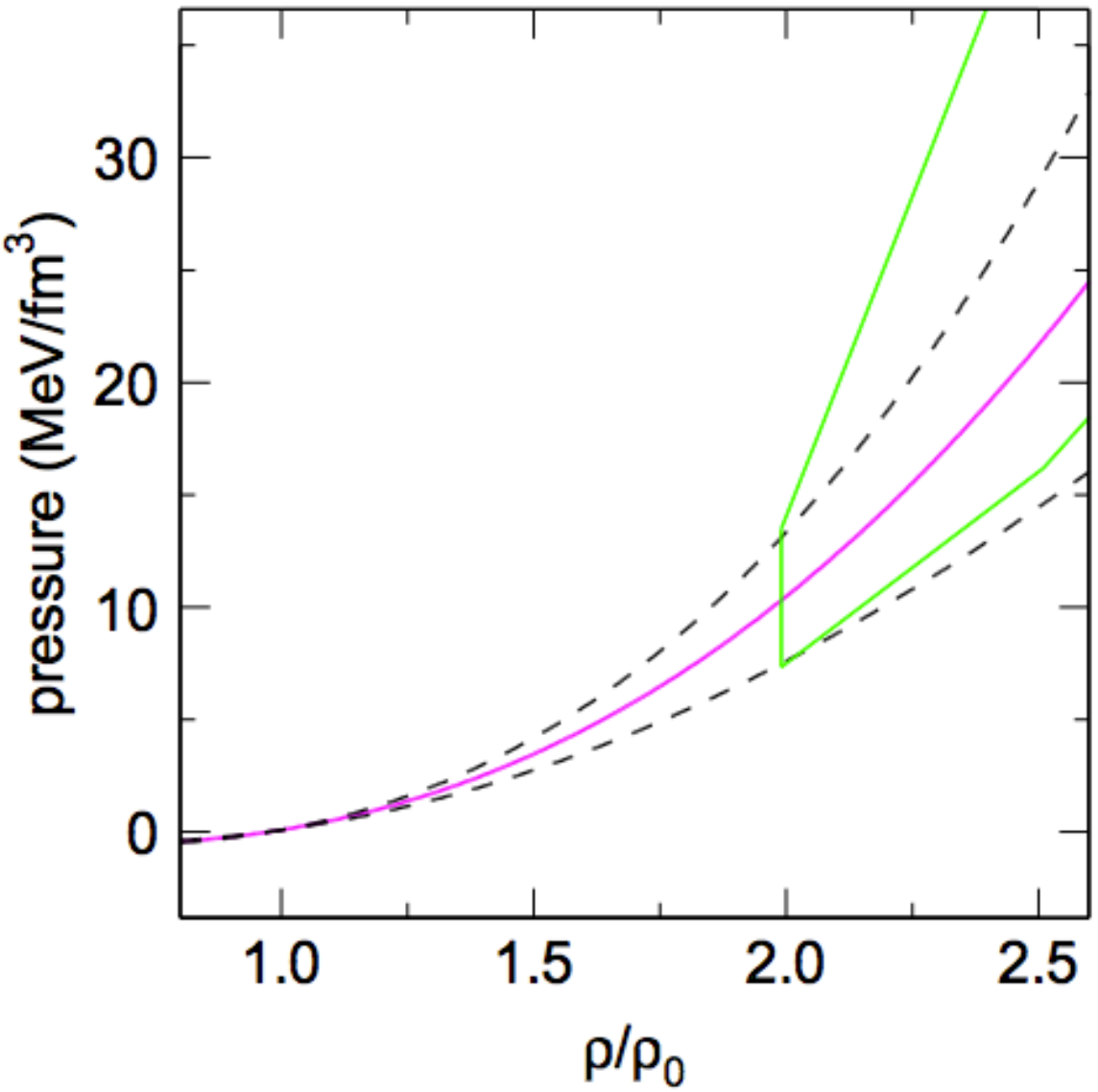
[b] *SUBATECH, UMR 6457, Ecole des Mines de Nantes - IN2P3/CNRS - Université de Nantes, France*

Abstract

Using FOPI data on elliptic flow in Au+Au collisions between 0.4 and 1.5A GeV we extract constraints for the equation of state (EOS) of compressed symmetric nuclear matter using the transport code IQMD by introducing an observable describing the evolution of the size of the elliptic flow as a function of rapidity. This observable is sensitive to the nuclear EOS and a robust tool to constrain the compressibility of nuclear matter up to 2 ρ_0.

EOS in Neutron Stars



A. Le Fèvre, Y. Leifels, W. Reisdorf , J. Aichelin, Ch. Hartnack

Nucl.Phys. A945 (2016) 112-133