NA52 - Strangelet and Particle Search in Pb-Pb Collisions

Bern Univ.•CERN•CRN,CNRS-IN2P3 Strasbourg•Helsinki Univ.
LAPP,CNRS-IN2P3 Annecy•Stockholm Univ.

Spokesperson: Klaus Pretzl
Laboratory of High Energy Physics, University of Bern
Sidlerstrasse 5, CH-3012 Bern, Switzerland
E-Mail: PRETZL@CERNVM.CERN.CH FAX: (+4131)6314405

Physics Goal:	Search for long-lived massive strange matter
Beam:	Pb at 160·A GeV/c
Target:	Pb

Physics Summary

The NA52 experiment will search for long-lived massive strange matter particles, *strangelets*, in Pb-Pb collisions at a beam momentum of 160 GeV/c per nucleon. It intends to look for both, positively and negatively charged massive objects with a low charge to mass ratio at 0^0 production angle, using the H_6-beamline in the North Experimental Area at CERN as a charged-particle spectrometer.

The strangelets will be identified by the measurement of their rigidity R in the spectrometer, their velocity, and their charge. The velocity will be determined from the time-of-flight (TOF) measurements provided by TOF scintillation counter hodoscopes positioned along the beam spectrometer. The dE/dx information from the TOF counters will be used for the charge measurement. A hadron calorimeter will complement the momentum information from the spectrometer with an independent energy measurement, thus providing redundancy for effective background rejection. The interesting charge and mass range ($|\mathrm{Z}|/m < 0.2$, $10 < m < 40\,\mathrm{GeV}/c^2$) of the strangelets can be covered quite effectively by two settings of the beam spectrometer with the rigidities R = 100 GV and R = 200 GV. With a distance of 524 m between the production target and the last counters in the beam spectrometer, the strangelets should have a lifetime $\gamma\tau > 2 \cdot 10^{-6}$ s in order to be detected. The aim of the experiment is to reach a detection sensitivity of 10^{-9} to 10^{-10} per interaction.

The NA52 experiment further intends to investigate particle production in Pb-Pb collisions with emphasis on *antibaryon* (antiproton, antideuteron, ...) production by measuring their production yields over more than 3 units of rapidity each and at production angles from 0 to 12 mrad. The particles will be identified by means of differential and threshold Čerenkov counters and by TOF measurements.

Selected Publications

"Proposal for a Strangelet and Particle Search in Pb-Pb Collisions", NEWMASS Collaboration, CERN / SPSLC **P 268**, March 13, (1992).

"Strangelet Search in S-W Collisions at 200·A GeV/c", contributed paper to the Quark-Matter '93 Conference, Borlänge, Sweden (1993).

"Strangelet Search in S-W Collisions at 200·A GeV/c", K. Borer *et al.*, Phys. Rev. Lett., **72**, N10 (1994) 1415-1418.

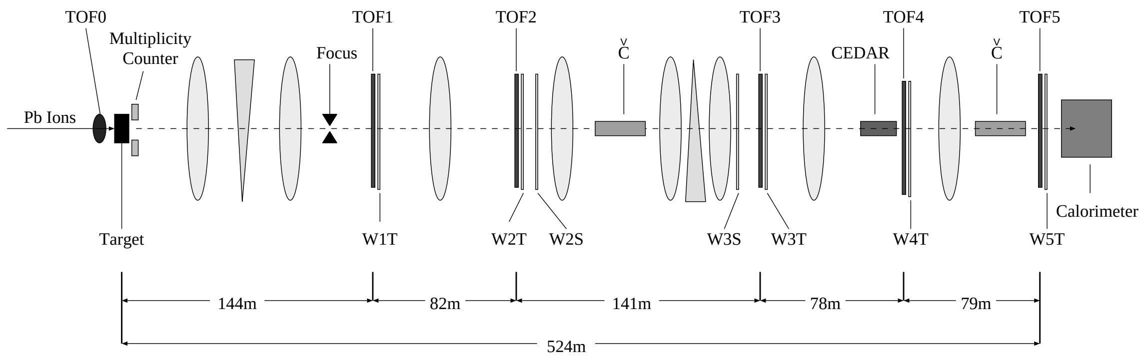

Figure 1: NA52 Experimental Setup

Figure Details

TOF0	Quartz Counter
TOF1, TOF2, TOF3, TOF4, TOF5	Time-of-flight Counter Hodoscopes with 8 slabs
W1T, W2T, W3T, W4T, W5T	Multiwire Proportional Chambers with x, y and v planes
W2S, W3S	Multiwire Proportional Chambers with x, y planes
Č	Threshold Čerenkov Counter
Calorimeter	Hadron Calorimeter

Related Experiments

E814, E858, E864, E878, E882, E886