Memorandum of the NA49 Collaboration to the SPSC

Status and further Analysis Plans of the NA49 Collaboration

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1 Introduction

The main aim of the NA49 experiment is the study of hadronic matter at highest temperatures and densities in Pb+Pb collisions in search for the onset of quark-gluon deconfinement. In addition, p+p and p+A reactions are investigated in order to elucidate the particle production mechanism in elementary collisions and to study the effects of cold nuclear matter on particle production yields.

This report discusses the analysis progress since the last submitted status reports of 2007 [2, 1] and presents the requests to CERN for the continuing work of the NA49 collaboration.

2 Publications in refereed journals since October 2007

- Pion and kaon production in central Pb+Pb collisions at 20A and 30A GeV; Evidence for the onset of deconfinement
  C. Alt et al., Phys.Rev. C77, 024903 (2008).
- High transverse momentum hadron spectra at $\sqrt{s_{NN}}$ = 17.3 GeV in Pb+Pb and p+p collisions
  C. Alt et al., Phys.Rev. C77, 034906 (2008).
- Bose-Einstein correlations of $\pi^-\pi^-$ pairs in central Pb+Pb collisions at 20A, 30A, 40A, 80A and 158A GeV
  C. Alt et al., Phys.Rev. C77, 064908 (2008).

3 Submitted for publication

- Energy dependence of multiplicity fluctuations in heavy-ion collisions at the CERN SPS
  accepted for publication in Phys.Rev. C.
- Energy dependence of particle ratio fluctuations in central Pb+Pb collisions from $\sqrt{s_{NN}}$ = 6.1 to 17.3 GeV
  submitted to Phys.Rev. C.
- Energy dependence of Λ and Ξ production in central Pb+Pb collisions at the CERN-SPS
  accepted for publication in Phys.Rev. C.
- Energy-dependence of Φ meson production in central Pb+Pb collisions at the CERN-SPS
  accepted for publication in Phys.Rev. C.
- Three dimensional two-pion source image from Pb+Pb collisions at $\sqrt{s_{NN}}$ = 17.3 GeV: New constraints for source breakup dynamics
  submitted to Phys.Lett. B.

4 Subjects of current analyses:

4.1 p+p and p+A reactions:

- charged particle yields in p+p and p+A collisions (Bratislava, Budapest, Cern, Krakow, Sofia, Warsaw groups)
  - final double differential invariant cross sections of kaon production in p+C interactions at 158 GeV/c as functions of p_T, x_F, y
  - final double differential invariant cross sections of p and $\bar{p}$ production in p+C interactions at 158 GeV/c as functions of p_T, x_F, y
  - final double differential invariant cross sections of p and $\bar{p}$ production in p+p interactions at 158 GeV/c as functions of p_T, x_F, y, m_T-m

– production of K^0_S, hyperons and hyperon resonances in p+p and p+Pb collisions (T. Anticic, V. Nicolic, T. Susa)

4.2 Pb+Pb reactions:

– Energy dependence of $\langle p_T \rangle$ fluctuations in central Pb+Pb collisions (K. Grebieszkow)
– Energy and system size dependence of hadron ratio fluctuations (D. Kresan, C. Höhne, T. Schuster, R. Stock)
– Centrality dependence of pion and kaon production in Pb+Pb collisions at 40A and 158A GeV (P. Dinkelaker, C. Höhne)
– Centrality dependence of p and $\bar{p}$ production in Pb+Pb collisions at 158A GeV (M. Utvic)
– Energy and centrality dependence of hyperon production in C+C, Si+Si and Pb+Pb collisions (M. Mitrovski, C. Blume)
– Centrality dependence of Φ meson production in Pb+Pb collisions at 40A and 158A GeV (V. Friese)
– Energy dependence of p and $\bar{p}$ production in central Pb+Pb collisions from 20A to 158A GeV at the CERN SPS (M. Kowalski)
– Antideuteron production in Pb+Pb collisions at the CERN SPS (V. Kolesnikov)
– Light nuclei production (^{3}He and t) in Pb+Pb collisions from 20A to 158A GeV at the CERN SPS (V. Kolesnikov)
– Production of K^*(890) in central Pb+Pb collisions at 158A GeV (M. Slodkowski)
– Azimuthal correlations at high p_T in 158A GeV Pb+Pb collisions (M. Szuba)
– Meson to baryon yield ratios at high p_T in Pb+Pb collisions at 158A GeV (A. Laszlo, T. Schuster)
– Proton-Λ correlations in Pb+Pb collisions at 158A GeV (H. Beck)
– K^0_S yields in Pb+Pb collisions (J. Book)
– Production of Λ(1520) in 158A GeV Pb+Pb collisions (I.-K. Yoo)
– Wounded nucleon and wounded quark scaling of particle production from nuclear collisions (B. Boimska, H. Bialkowska)
– Coulomb repulsion in Pb+Pb collisions (A. Rybicki)

5 Requests to CERN

The NA49 collaboration will continue an extensive analysis program with a considerable number of students and senior physicists at least until the end of 2009. To facilitate this work we request support from the CERN IT division at the level of 35 KSI2000 units in lxbatch. These resources are required for the simulation work connected with determining corrections during the physics analysis. This work has to use raw data which are stored on the CASTOR system. In addition, we request to keep the presently assigned office space. It is shared with the NA61 collaboration to which the majority of NA49 groups also belong.

References

[1] C. Alt et al., *Status and further Analysis Plans of the NA49 collaboration*, CERN-SPSC-2007-026.
[2] D. Varga et al., *Status and Plans of NA49 p+p and p+A Programme*, CERN-SPSC-2007-031.