HK 55 Hauptvorträge

Zeit: Freitag 10:30–12:30 Raum: A

Hauptvortrag HK 55.1 Fr 10:30 A

Projektil-Coulombanregung von Off-Yrast-Kernzuständen: Niedrig-Multiplizitäts-Gammaspektroskopie mit granularen 4π-Detektoren — •N. Pietralla — NSL, Dept. of Physics, SUNY, Stony Brook, NY — Institut für Kernphysik, Universität zu Köln

Die weltweit stattfindenden Aufbauten von Beschleunigern für intensive Ionenstrahlen instabiler Nuklide erzwingt in der Kernstrukturphysik eine Hinwendung zu Experimentiermethoden, die geeignet sind zur Erforschung der Projektil-ähnlichen Reaktionsprodukte. Gammaspektroskopie in Projektil-Coulombanregung ist eine der am leichtesten zugänglichen Methoden und erlaubt Modell-unabhängige Identifizierung von kollektiven Kernzuständen oder von solchen mit Einteilchen-Charakter. Das Forschungspotenzial wird am Beispiel des Kerns ^{138}Ce diskutiert.

Die Experimente wurden am Argonne National Laboratory, U.S.A., durchgeführt. Ionenstrahlen des Nuklids ^{138}Ce wurden von der ATLAS-Beschleunigeranlage mit einer Intensität von $6{\cdot}10^9$ Teilchen/s auf eine Energie von 480 MeV beschleunigt und auf ein Kohlenstoff-Target geschossen. Die erzeugte Gammastrahlung wurde mit dem Gammasphere Detektorfeld fast über den gesamten Raumwinkel hochauflösend beobachtet. Die Daten [1] erlauben u.a. die erste Identifikation eines Proton-Neutron gemischt-symmetrischen Zustands des Nuklids ^{138}Ce und die Bestimmung eines F-Spin Mischungsmatrixelements erstmals direkt aus den Beobachtungen eines dominant gemischt-symmetrischen Zustands.

Ein Ausblick auf zukünftige Forschung, etwa an der REX-ISOLDE Anlage am CERN oder mit dem AGATA-Spektrometer, wird gewagt.

[1] G. Rainovski, N. Pietralla *et al.*, zur Veröffentlichung eingereicht.

Hauptvortrag HK 55.2 Fr 11:00 A

First measurement of the ρ spectral function in high-energy nuclear collisions — •Sanja Damjanovic — Universitaet Heidelberg

The NA60 experiment has studied low-mass muon pairs in 158 AGeV Indium-Indium collisions at the CERN SPS. A strong excess of pairs is observed above the yield expected from neutral meson decays. The unprecedented sample size of close to 400K events and the good mass resolution of about 2% allow to isolate the excess by subtraction of the decay sources. The shape of the resulting mass spectrum is consistent with a dominant contribution from $\pi^+\pi^- \to \rho \to \mu^+\mu^-$ annihilation. The associated ρ spectral function shows a strong broadening, but essentially no shift in mass. The results are discussed in the frame of different theoretical approaches addressing hadron properties close to the QCD phase boundary. They may rule out models linking hadron masses directly to the value of the chiral condensate.

Hauptvortrag HK 55.3 Fr 11:30 A

String breaking in QCD — •Gunnar Bali — Department of Physics and Astronomy, The University of Glasgow

The most striking feature of Young-Mills Theories is the confinement of fundamental colour sources (quarks). Even in QCD with sea quarks an effective confinement is still realized and isolated quarks cannot be observed. However, in this case quark-antiquark pairs can be created out of the vacuum. These non-perturbative features are not understood analytically, however, they have been verified by means of computer-simulations (Lattie QCD). In particular, in pure gauge theories a linearly confining potential between static quarks is established since over 20 years. The breaking of this confining string in QCD, due to quark pair creation, however, was not confirmed until last year. An introduction will be given into this problem which goes beyond the quark model. The dynamics of the string breaking mechanism will be studied in detail and the relationship to heavy quarkonium decay highlighted.

Hauptvortrag HK 55.4 Fr 12:00 A

Probing the in-medium properties of hadrons with di-electrons — •Christian Sturm for the HADES collaboration — J.W. Goethe-Universität Frankfurt, Max-von-Laue-Str.1, 60438 Frankfurt am Main

The spectroscopy of electron-positron pairs represents a unique tool to investigate the properties of hadrons in dense nuclear matter produced in relativistic heavy ion collisions. At bombarding energies of 1-2 GeV/nucleon available at SIS/GSI nuclear matter is compressed up to 3 times the saturation density at moderate life times. The di-lepton spectrometer HADES at GSI is designed to study electron-positron pairs emitted in collisions of heavy ions as well as in proton and pion induced reactions on protons and nuclei. A major goal is to investigate hadron properties in the vacuum and in nuclear matter, in particular to search for in-medium mass modifications of light vector mesons. In C+C collisions at 2 GeV/nucleon incident energy almost 20000 e^+e^- pairs have been reconstructed in the invariant mass range up to 1 GeV/c^2 . In p+p collisions at 2.2 GeV incident energy the η meson has been identified in the electromagnetic decay channel $\eta \to e^+e^-\gamma$ as well as in the hadronic decay channel $\eta \to \pi^+\pi^-\pi^0$ to determine the electron reconstruction efficiency. The e^+e^- invariant mass spectra obtained in C+C and p+p reactions will be shown and compared to transport model calculations.

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