HK 56: Heavy Ion Collision and QCD Phases XI

Zeit: Donnerstag 16:30–18:00 Raum: S1/01 A01

HK 56.1 Do 16:30 S1/01 A01

Photons from partonic transport — •Moritz Greif — Goethe Universität Frankfurt

We investigate photon production processes in the quark-gluon plasma. Several photon production processes are included in the partonic cascade BAMPS (Boltzmann Approach to Multi-Parton Scatterings). BAMPS provides a microscopic tool to study expanding fireballs, employing a stochastic method to solve the relativistic 3+1d Boltzmann equation for quarks, gluons and photons. The partonic cascade is applicable over the whole evolution of the plasma, thus giving insights also about the early, off-equilibrium phase. Apart from Compton/annihilation scattering we include inelastic bremsstrahlung cross sections and obtain rates that are compatible with resummed pQCD including interference effects. This opens up a variety of possible studys. We show results for photon spectra from the quark-gluon plasma and investigate its role for the elliptic flow of photons. Especially the transfer of anisotropy from the flowing medium onto photons can be understood microscopically.

HK 56.2 Do 16:45 S1/01 A01

Measurement of isolated photons with ALICE — •Marco Marquard — Institut für Kernphysik, Goethe Universität Frankfurt am Main

Isolated photons at high transverse momenta are produced in initial hard-scattering processes in high-energy pp and heavy-ion collisions. Such processes are thought to scale by the number of binary nucleon-nucleon collisions in heavy-ion collisions, hence isolated photons can be used to test scaling properties of particle production in such collisions. Furthermore they may give insight to possible modifications of nuclear PDFs. In order to interpret isolated photon spectra in heavy-ion and p-Pb collisions at the LHC, they have to be measured in fundamental pp collisions.

After an introduction of the analysis technique, the status of the isolated photon measurement in pp collisions with the ALICE EMCAL will be presented. The cross section of isolated photons, necessary corrections and systematic studies will be discussed.

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HK 56.3 Do 17:00 S1/01 A01

Photon HBT with ALICE — •Hans Beck for the ALICE-Collaboration — Physikalisches Institut, University of Heidelberg

Photon-photon correlations at small relative momentum carry a distinct signal from the quantum statistical interference of the photons' wave functions. Being sensitive to the size of the emitter, these photon correlations bear the unique opportunity to directly study the supposedly hydrodynamical evolution of the source beyond kinetic freeze-out. This qualitatively distinguishes two-photon correlations from hadron femtoscopy.

ALICE at the LHC allows to observe photons via their conversion to charged leptons reconstructed with the tracking detectors and the direct identification in its electromagnetic calorimeters. An experimental advantage is the absence of two-particle resolution effects when combining the two methods.

We present correlation functions of photon candidates from the Run 1 Pb-Pb dataset and quantify the clear signal at zero relative momentum in terms of its height and width differentially in pair transverse momentum over a range of several GeV/c. We prove previously neglected processes to significantly contribute by rejecting them via specific two-particle criteria and presenting the impact on the correlation function. An outlook is given.

HK 56.4 Do 17:15 S1/01 A01

Status of the direct photon analysis for Au+Au collisions at 1.23 AGeV measured by the HADES experiment — •Christina Deveaux for the HADES-Collaboration — Justus-Liebig-Universitaet

Measurements of direct photons from PHENIX and ALICE experiments at high energies show an unexpectedly high yield combined with a large elliptic flow. Both observations cannot be reconciled with current models describing the evolution of the fireball. In order to provide additional empirical data to this discussion, we analyze data on Au+Au collisions at 1.23 AGeV taken by the HADES experiment at GSI Helmholtzzentrum, Darmstadt. We present the status of our direct photon reconstruction and discuss the option to extend this study to elliptic flow. Supported by BMBF and HIC for FAIR.

HK 56.5 Do 17:30 S1/01 A01

Reconstruction of Neutral Mesons via Conversion Method in Au+Au at 1.23AGeV with HADES — •Claudia Behnke for the HADES-Collaboration — IKF, Goethe Universität Frankfurt

The HADES experiment at GSI Helmholtzzentrum für Schwerionenforschung in Darmstadt has measured virtual photon production in Au+Au collisions at 1.23 AGeV. The yield measured for the Au+Au systems exceeds the N+N reference by a factor 8-10. A more accurate determination of the medium radiation depends on a precise knowledge of the underlying hadronic cocktail composed of various sources contributing to the net spectra. Therefore, a measurement of the neutral meson yields together with the dileptons is crucial. In this contribution, the capability of HADES to detect e^+e^- pairs from conversion of real photons will be demonstrated. We will present results from a two-photon analysis of Au+Au collisions at 1.23 AGeV providing information of neutral π^0 and η mesons. A phase space dependent analysis of π^0 production as well as a yield estimation for the η-meson will be presented. Supported by BMBF (05P12RFGHJ,05P15RFFCA), HIC for FAIR, GSI, HGS-HIRe and H-QM.

HK 56.6 Do 17:45 S1/01 A01

Neutral Meson Measurements using Conversions in Proton-Proton Collisions at $\sqrt{s}$ = 8 TeV in ALICE — •Nicolas Schmidt for the ALICE-Collaboration — Physikalisches Institut, Heidelberg University

The ALICE detector is dedicated to study the properties of the Quark-Gluon-Plasma (QGP), which is created in Pb-Pb collisions at high energies. The spectra in pp-collisions are used to obtain a baseline of hadron production for heavy ion collisions. This work focuses on the neutral mesons and the measurement via the two photon decay channel. The photons are reconstructed through their conversions in the detector material. For this, the ALICE Inner Tracking System (ITS) and the Time Projection Chamber (TPC) are mainly used. The status of the analysis of neutral mesons in pp-collisions at $\sqrt{s} = 8$ TeV will be presented. Step by step, the signal extraction and applied efficiency correction will be explained. Final results are discussed and put into context with measurements at lower energies.