

4th International Conference on New Frontiers in Physics ICNFP2015

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Book of Abstracts

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Opening

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The Constituent-Quark Model - Nowadays

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The notion of (constituent) quarks has been introduced more than fifty years ago. Quantum chromodynamics (QCD) was invented more than forty years ago, and it has not yet been amenable to a satisfactory solution up till now. The more there is the need for an effective description of hadrons at low and intermediate energies in view of the wealth of phenomenological data accumulated over the past decades. I discuss the present performance of a modern constituent-quark model as an effective tool for the description of baryons in the non-perturbative regime of QCD. In particular, I address a relativistic constituent-quark model capable of describing all known baryons with flavors u, d, s, c, and b universally in a single framework. Hereby baryons are considered as systems of three relativistic constituent quarks, whose flavor-dependent interactions are based on the exchange of Goldstone bosons within $SU(5)_F$ and implemented into a Poincaré-invariant interacting mass operator. Predictions for the spectroscopy of baryons containing all flavors u, d, s, c, and b compare well with the existing phenomenology and with modern results available from lattice QCD. Similarly the structures of baryons as revealed under electromagnetic, weak, hadronic, and gravitational interactions are consistently described. Covariant results so far obtained for electromagnetic, axial, strong, and gravitational form factors of the nucleons, the deltas, and the hyperons turn out to be in good agreement with experimental data as well as insights obtained from lattice QCD. The presented relativistic constituent-quark model should provide a solid basis for introducing QCD effects consistently into a variety of processes involving hadrons, reaching from particle to nuclear physics.

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Charmonium production on nuclei: a story of surprises

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Soft physics of heavy ion collisions

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Recent Results from the Telescope Array Ultra High Energy Cosmic Ray Observatory

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Welcome from Organizers

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Photons walking the line

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Hagedorn temperature and physics of black holes

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Flavour Physics at LHCb

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Observation of pentaquark resonances in $\Lambda_b \rightarrow J/\psi K p$ decays

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The restless gamma-ray sky and clues on new physics: seven years of discoveries with Fermi Large Area Telescope

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Progress report for the AEGIS antimatter gravity experiment

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Space research and radiobiology at FAIR

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Proton structure and PDFs from HERA

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Central Exclusive production at hadron colliders

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Highlights from Belle

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Precision Measurement of the Proton and Helium Fluxin Primary Cosmic Rays with AMS-02

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Chaotic vortical flows and their manifestations

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Standard Model results with the CMS experiment

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Searching for the QCD critical point through power-law fluctuations of the proton density in A+A collisions at 158A GeV

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Measurements of the properties of the Higgs boson using the ATLAS Detector

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Perfect Abelian dominance of confinement in mesons and baryons in SU(3) lattice QCD

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Highlights from the COMPASS experiment at CERN - Hadron spectroscopy and excitations

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New tests of variability of the speed of light

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Spin Physics Results from PHENIX

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Recent results from NA61/SHINE

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Summary:

The NA61/SHINE experiment aims to discover the critical point of strongly interacting matter and study the properties of the onset of deconfinement. For this goal the scan through two dimensional phase diagram ($T-\mu_B$) is being performed at the SPS by measurements of hadron production in proton-proton, proton-nucleus and nucleus-nucleus interactions as a function of collision energy and system size.

In this contribution intriguing results on the energy dependence of hadron spectra and yields in inelastic p+p and centrality selected Be+Be collisions will be presented. In particular, the energy dependence of the signals of deconfinement, the “horn”, “step” and “kink”, in p+p interactions will be presented and compared with the corresponding results from central Pb+Pb collisions from NA49.

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Precision measurements of Standard Model parameters and Review of Drell-Yan and vector boson plus jets measurements with the ATLAS detector

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Combination of couplings of the Higgs boson by the ATLAS experiment with Run 1 data

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Very-high energy astrophysical neutrinos with IceCube

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Recent results on soft QCD topics, and jet and photon production from ATLAS

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Searches for new physics with top- and bottom-quark signatures using the ATLAS detector

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Hagedorn's Limiting Temperature and the Onset of Deconfinement

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A possible evidence of observation of two mixed phases in nuclear collisions

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High temperature Bose-Einstein condensation

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Recent progresses in heavy flavor physics in URHIC

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Search for sterile neutrino mixing in the $\nu_\mu \rightarrow \nu_\tau$ appearance channel with the OPERA detector

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Performance of the photon reconstruction and identification in ATLAS

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Update on the Majorana Demonstrator

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CMS detector performance

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Schrödinger operator with delta'-interaction supported by non-closed curve

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Searches for direct pair production of third generation squarks with the ATLAS detector

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Open-charm production measurements with ALICE at the LHC

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Analytical Formulae linking Quark Confinement and Chiral Symmetry Breaking

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Summary:

Quark confinement and chiral symmetry breaking are two outstanding nonperturbative properties of QCD, and their relation has been one of the important issues in particle and nuclear physics. For the Polyakov and Wilson loops, we derive analytical formulae between quark confinement and Dirac eigenvalues in the lattice QCD formalism. For the temporal lattice with an odd-number, we find that the Polyakov loop is simply expressed with the Dirac eigenvalues [1]. Also, we obtain a similar relation between the Wilson loop and the Dirac eigenvalues. From these formulae, we find that the contribution from the low-lying Dirac eigenvalues is found to be negligibly small for quark confinement, while the

low-lying Dirac modes are essential for chiral symmetry breaking, as was numerically shown in lattice QCD simulations [2]. We also our present recent study on Polyakov-loop fluctuations in the Dirac eigenmode expansion [3] in the context of deconfinement transition in thermal QCD [4].

[1] T.M. Doi, H. Suganuma and T. Iritani, Phys. Rev. D90 (2014) 094505.

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The Universal Wave Function Interpretation of String Theory

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Bose–Einstein correlations of charged and neutral kaons in p-p and Pb-Pb collisions with the ALICE experiment at the LHC

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Investigation of Particle Coherence in Pb+Pb Collisions at LHC

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Non-photonic electrons in central U+U collisions at STAR

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Leaky quantum wires. On relation between geometry and spectrum

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SUSY with the CMS experiment

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Chiral symmetry breaking of compactified (2+1)-dimensional Gross-Neveu model in presence of external magnetic field

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Duality of Psychological and Intrinsic Time in Artworks

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Interacting relativistic quantum dynamics for multi-time wave functions

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The magnetic polarizabilities and g-factor of the charged and neutral rho mesons in a strong magnetic field on the lattice

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Two-particle correlations using THERMINATOR model for BES program

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A New Approach to Analytic, Non-Perturbative Gauge-Invariant QCD Renormalization is described, with applications to high energy elastic p-p scattering

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Searches for electroweak production of supersymmetric gauginos and sleptons with the ATLAS detector

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Einstein's Credo and modern physics

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New Quantum Effect: Emission of Cosmic X- or γ -rays by Moving Unstable Particles at Late Times

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Polarizability of pseudoscalar mesons from the lattice calculations

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Absence of the Gribov ambiguity in a quadratic gauge

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Inclusive searches for squarks and gluinos with the ATLAS detector

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Opto-Box: Optical Modules and Mini-Crate for ATLAS Pixel and IBL Detectors

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Dual condensates at finite isospin chemical potential

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On Discrete (Digital) Physics: as a Perfect Deterministic Structure for Reality - And the Fundamental Field Equations of Physics

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Search for long-lived neutral particles decaying into lepton jets in 20.3 fb⁻¹ proton-proton collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector

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Modelling of interaction of material plane with spinor field in the framework of the Symanzik approach

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Femtосcopy with unlike-sign kaons at STAR in 200 GeV Au+Au collisions

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Commutative fuzzy geometry and Nonlinear Quantum Dynamics

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Long range force and Y-Bosonic strings in Baryons

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False vacuum as a quantum unstable state

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Performance Studies of Micromegas Chambers for the New Small Wheel Upgrade Project

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Particles composition and interactions using the NUON Model

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On light dilaton extensions of the standard model

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Search for new particles in events with one lepton and missing transverse momentum in pp collisions at $\sqrt{s} = 8$ TeV

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Antihydrogen dynamics in the AEGIS experiment

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Search for space charge effects in the ICARUS T600 LAr-TPC

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If God Plays Dice, Must We do the Same? Quantum Entanglement as a Deterministic Phenomenon

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Muon reconstruction performance in ATLAS at Run-II

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Spinorial Regge Trajectories and Hagedorn-like temperatures

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Spinorial Space-Time and the origin of Quantum Mechanics

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Performance of the ALICE secondary vertex b-tagging algorithm

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Massive Gravi-Electromagnetism in Terms of Octons

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First evidence of LPM effect in LHCf, an LHC experiment

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Observation of resonant J/Psi_p states in Lambda_b decays

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Social event

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Thermalization in strongly coupled confining gauge theories

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ALICE overview

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Overview of recent ATLAS results

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CMS overview

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Overview of ATLAS Standard Model Measurements

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Higgs results from CMS

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Higgs results from ATLAS

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Supersymmetry searches in ATLAS

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Top quark physics from run 1 of the LHC

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Interaction of Relativistic Highly Charged Ions with crystals: from collisions towards high resolution spectroscopy

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The MoEDAL Experiment at the LHC - Exploring Beyond the Standard Model

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Results from the OPERA experiment at the CNGS beam

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Educational projects

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Anomalous transport in second order hydrodynamics

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Double unification of particles with fields and gravity with electricity under Aristotle's nonempty space can rid of Coulombs divergences and metric singularities

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Recent HERA results on hard QCD and heavy flavour production

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Aspects of meson condensation

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New Ferroelectric Transitions in Magnetic Hydroxyl Salts $\text{Co}_2(\text{OD})_3\text{Cl}$ and $\text{Co}_2(\text{OD})_3\text{Br}$

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Beyond-the-Standard Model Higgs Physics using the ATLAS Experiment

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Oblique corrections in the Dine-Fischler-Srednicki axion model

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Anisotropic Flow Fluctuations in Pb+Pb collisions at LHC (HYD-JET++ Model)

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On 3D minimal massive gravity

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Recent HERA results on diffraction and exclusive final states

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On the base quantities of oscimodes of valence q , q bar and $3q$ states

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New frontiers in photonic functions

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Searches for new physics with lepton flavors and multi-lepton final states with the ATLAS detector

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Advanced Virgo - Status & Perspective of the upgraded Gravitational Wave detector

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Phenomenology of charmed mesons in a chiral symmetric model

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Quarkonia with STAR at RHIC

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Precision X-ray spectroscopy of kaonic atoms as a probe of kaon-nucleon/nuclei interaction at low energy

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The Compact Linear Collider study

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Highlights from Super-Kamiokande

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Recent Results from the Daya Bay Reactor Neutrino Experiment

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Recent Borexino results and prospects for the near future

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An Experimental Programme at the DUNE Experiment

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Heavy flavors in nucleus-nucleus and proton-nucleus

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Heavy-flavour measurements at the LHC

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Open heavy flavor at RHIC

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Review of recent results on jet physics in Heavy Ion from LHC

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Transport phenomena in a plasma of confining gluons

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Recent highlights of PHENIX at RHIC

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Angular correlations in pp collisions - overview

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Highlights of DAMA/LIBRA

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AGN observations with a 100 GeV threshold using H.E.S.S.II

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Recent physics results from BaBar

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Physics and Philosophy: Tao Source Physics

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Discrete Symmetries CP, T, CPT

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Neutrino Oscillation and Resolving the Neutrino Mass Ordering

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Status of the NICA project at JINR

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Electromagnetic probes of QCD matter: an experimental overview

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Determination of α_s from the QCD static energy

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Exotics with Effective Field Theories

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New quantum reality as revealed by weak measurements

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Big Bang, inflation, standard Physics... and the potentialities of new Physics and alternative cosmologies

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Overview of the CLIC detector and its physics potential

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A search for very-high-energy emission by gamma ray bursts with HAWC

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Prospects of new physics searches short and long term future

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Future Accelerators at the High Energy Frontier

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Perspectives for New Physics at the LHC

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Quark Matter in Compact Stars and in Heavy-Ion Collisions

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The effect of finite chemical potential in the production of electromagnetic radiation

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Two-particle angular correlations in small systems at the LHC in ALICE

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Multiplicity Distributions and fluctuations in Heavy-Ion Collisions

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Evolution of quark-gluon plasma and quark-hadron phase transition

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Transformations Between Accelerated Frames with the Equivalence Principle and Lie Group Technique

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Long range force in the baryon at finite T

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High multiplicity proton-proton events: a new horizon in multi-particle production

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Bose-Einstein effects in angular correlations and balance function in pp collisions using PYTHIA8 simulations

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Universality of particle production and energy balance in hadronic and nuclear collisions

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Inclusive photon production at forward rapidities in pp collisions at LHC energies

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B physics results from CMS

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Heavy Quark dynamics in the Quark-Gluon Plasma and the puzzling relation between R_{AA} and v_2

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The q-statistics and QCD thermodynamics at LHC

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Event-by-event fluctuation and correlation measurements at the LHC energies in ALICE

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Local Efficiency Corrections to Higher Order Cumulants

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BESIII Physics Highlights

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Recent results from NA61/SHINE

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The NA61/SHINE experiment aims to discover the critical point of strongly interacting matter and study the properties of the onset of deconfinement. For this goal the scan through two dimensional phase diagram ($T-\mu_B$) is being performed at the SPS by measurements of hadron production in proton-proton, proton-nucleus and nucleus-nucleus interactions as a function of collision energy and system size.

In this contribution intriguing results on the energy dependence of hadron spectra and yields in inelastic p+p and centrality selected Be+Be collisions will be presented. In particular, the energy dependence of the signals of deconfinement, the “horn”, “step” and “kink”, in p+p interactions will be presented and compared with the corresponding results from central Pb+Pb collisions from NA49.