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MUHAMMAD AJAZ

Assistant Professor of Physics,
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Major Fields

Nuclear Physics, Radiation Physics, High Energy Physics, Heavy Ion Physics, Nuclear Matter under extreme conditions Delepton and Quarkonia, Heavy Flavor Physics.

Education

Graduate Studies:

PhD (High Energy Physics) 2008-2013

Major Courses: Particle Physics-I, Particle Physics-II, Kinematics of Nuclear Reactions at high energies, Particle collisions, Advanced Quantum Physics, Advanced Statistical Physics, Neutrino Physics

Research title: Study of the *Nuclear Transparency Effect at 4.2A GeV/c*

MS (Physics) Sep 2006 – June 2008

Major Courses:

Nuclear Physics, Radiation Physics, Particle Detection and Measurements, Environmental Radiation Dosimetry, High Energy Physics, Heavy Ion Physics

Research title: *Nuclear Transparency Effect at Ultra relativistic Heavy Ion Collisions*

M.Sc. Physics (Course work)

Modern Physics, Classical Mechanics, Quantum Mechanics, Electronics, Nuclear Physics. Electrodynamics, Statistical Mechanics, Solid State Physics.

Under graduate studies:

Degree/ Certificates	Major Subjects	Marks Obtained	Total Marks	Div.
B. Ed	Teaching of Physics and Mathematics	560	900	1 st
B. Sc.	Physics, Computer Science and Math A.	339	550	1 st
F. Sc.	Physics, Math, Chemistry, English and Urdu.	732	1100	1 st
S.S.C	Physics, Math, Chemistry	534	850	1 st

International Schools	Subjects/ Courses/ Topics covered during the School.
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Summer Student Program at CERN (The European Organization for Nuclear Research) from 23rd June, 2008 to 31st August, 2008.	Introduction to Particle Physics, Accelerator Physics - Introductory Lecture, Nuclear Physics - Introductory Lecture, Antimatter in the Lab, Detectors, Introduction to the ROOT System, Fundamental Concepts in Particle Physics, Astroparticle Physics, Neutrino Physics, The Standard Model, Superconducting Magnets, Physics at Hadronic Colliders, Introduction to Cosmology, Beyond the Standard Model, Introduction to Statistics, Data Acquisition Systems, Introduction to Electronics, Introduction to Medical Physics, Future Linear Colliders, Installation, Commissioning and startup of the CMS experiment, From Heavy-Ion Collisions to Quark Matter, Matter-Antimatter Symmetry Violation and Matter Genesis, Installation, Commissioning and startup of the ATLAS experiment, From Raw Data to Physics Results, The GRID, Commissioning and startup of the LHC accelerator,
International School of Sub Nuclear Physics, 47th Course: The Most Unexpected at LHC and the Status of High Energy Frontier 29 August – 7 September 2009.	HOT THEORETICAL TOPICS: <i>The Landscape and Cosmological Vacuum Selection, Ultraviolet Behavior of N=8 Super gravity, Microscopic Black Holes, Entropy and Particle Species, Flux Vacua and Super symmetry Breaking in String Theory, Is the Best Superstring Model NP Complete?, Supergravity: Foundations and Applications,</i> SEMINARS ON SPECILIZED TOPICS: <i>Extra-Dimensions in Superstring Theories: Experimental Results Diffraction with Real and Virtual photons at High Energies, Status of Dark Matter and Neutrino Physics Results from RHIC with Implications for LHC, Status of Black Holes Physics, Complexity and Prediction in Frontier Physics.</i> HOW COSMOLOGY AFFECTS SUBNUCLEAR PHYSICS: <i>Present Status of Inflationary Cosmology String Cosmology and CMB</i> HIGHLIGHTS FROM LABORATORIES:BNL–RHIC, CERN, FERMILAB, E. FERMI CENTRE, GRAN SASSO, ISS–AMS,

International conferences	<ol style="list-style-type: none"> 1. 5th International Particle Physics workshop at QAU, Islamabad 2. Mini Symposium at HEC auditorium 3. Nano Technology workshop at Margala Hotel 4. Meeting with Nobel Laureates at NCP Islamabad. 5. First National Winter Meeting on Particles and Fields, NCP, Islamabad. 6. First School on LHC Physics at NCP, QAU Islamabad, Pakistan.
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Personal Skills	Languages: spoken and written fluency in English, Urdu and Pashto. Computer: Linux, C++, ROOT, Microsoft Windows and Internet Explorer; FORTRON, Microsoft Office, Typing Speed 40 WPM. Simulating packages: FASTMC, HIIJING and UrQMD.
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PUBLICATIONS IN REFERED JOURNALS WITH IMPACT FACTOR IN THE LAST 5 YEARS

1. ALICE Collaboration "Multiplicity Dependence of Pion, Kaon, Proton and Lambda Production in p-Pb Collisions at ($\sqrt{s_{NN}}$) = 5.02 TeV " (2014) Phys.Lett. B Vol:728 pp:25-38
2. ALICE Collaboration "J/ ψ production and nuclear effects in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV " (2014) JHEP Vol:1402 pp:073
3. ALICE Collaboration "Two and Three-Pion Quantum Statistics Correlations in Pb-Pb Collisions at $\sqrt{s_{NN}}$ =2.76 TeV at the LHC " (2014) Phys.Rev. C Vol:89 pp:024911
4. ALICE Collaboration "Measurement of charged jet suppression in Pb-Pb

- collisions at $\sqrt{s_{NN}} = 2.76$ TeV " (2014) JHEP Vol:1403 pp:013
5. ALICE Collaboration "Multi-strange baryon production at mid-rapidity in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV " (2014) Phys.Lett. B Vol:728 pp:216-227
 6. H. Younis F. Balestra F. Iazzi R. Introzzi A. Lavagno V. Rigato H. Affan and M. Ajaz "Characteristic study of the internal target for the Double Hypernuclei physics at PANDA" (2014) Journal of Instrumentations "2014 JINST 9 P04012" Vol:09 pp:P04012
 7. Kamal Hussain Khan, M. K. Suleymanov, M. Ajaz, Ali Zaman and Sh. Khalilova "Light nuclei formation in 12CC collisions at 4.2A GeV/c" (2014) Modern Physics Letters A Vol:29 pp:1450063-1-1450063-8
 8. M. Ajaz, M.K. Suleymanov, K.H. Khan, A. Zaman "Study of the behavior of the nuclear modification factor in freeze-out state " (2013) Chin.Phys. C Vol:37 pp:024101-1-024101-4
 9. ALICE Collaboration "Measurement of the inclusive differential jet cross section in pp collisions at $\sqrt{s}=2.76$ TeV " (2013) Phys.Lett. B Vol:722 pp:262-272
 10. ALICE Collaboration "Directed flow of charged particles at midrapidity relative to the spectator plane in Pb-Pb collisions at $\sqrt{s_{NN}}=2.76$ TeV " (2013) Phys.Rev.Lett. Vol:111 pp:232302
 11. ALICE Collaboration "Long-range angular correlations of π , K and p in p--Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV " (2013) Phys.Lett. B Vol:726 pp:164-177
 12. ALICE Collaboration "K⁰S and Λ production in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV " (2013) Phys.Rev.Lett. Vol:111 pp:222301
 13. ALICE Collaboration "Pseudorapidity density of charged particles p-Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV " (2013) Phys.Rev.Lett. Vol:110 pp:032301
 14. ALICE Collaboration "Charge correlations using the balance function in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV " (2013) Phys.Lett. B Vol:723 pp:267-279
 15. ALICE Collaboration "Centrality determination of Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV with ALICE " (2013) Phys.Rev. C Vol:88 pp:044909
 16. ALICE Collaboration "Centrality dependence of π , K, p production in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV " (2013) Phys.Rev. C Vol:88 pp:044910
 17. ALICE Collaboration "Centrality dependence of the pseudorapidity density distribution for charged particles in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV " (2013) Phys.Lett. B Vol:726 pp:610-622
 18. ALICE Collaboration "Charmonium and e^+e^- pair photoproduction at mid-rapidity in ultra-peripheral Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV " (2013) Eur.Phys.J. C Vol:73 pp:2617
 19. M. Ajaz, M.K. Suleymanov, K.H. Khan, A. Zaman "Nuclear transparency effect of π^- -mesons in p+12C- and d+12C- interactions at 4.2A GeV/c" (2013) Journal of Physics G: Nuclear and Particle Physics Vol:40 pp:055101-1-055101-8
 20. M. Ajaz, M.K. Suleymanov, K.H. Khan, A. Zaman, H. Younis, A. Rahman "Study of some characteristics of protons using interactions of light nuclei " (2013) Mod.Phys.Lett. A Vol:28 pp:1350175-1-1350175-7
 21. ALICE Collaboration "Mid-rapidity anti-baryon to baryon ratios in pp collisions at $\sqrt{s} = 0.9, 2.76$ and 7 TeV measured by ALICE " (2013) Eur.Phys.J. C Vol:73 pp:2496

22. ALICE Collaboration "Energy Dependence of the Transverse Momentum Distributions of Charged Particles in pp Collisions Measured by ALICE" (2013) Eur.Phys.J. C Vol:73 pp:2662
23. ALICE Collaboration "Multiplicity dependence of the average transverse momentum in pp, p-Pb, and Pb-Pb collisions at the LHC " (2013) Phys.Lett. B Vol:727 pp:371-380
24. ALICE Collaboration "Multiplicity dependence of two-particle azimuthal correlations in pp collisions at the LHC " (2013) JHEP Vol:1309 pp:049
25. ALICE Collaboration "D meson elliptic flow in non-central Pb-Pb collisions at $\sqrt{s_{NN}}=2.76\text{TeV}$ " (2013) Phys.Rev.Lett. Vol:111 pp:102301
26. ALICE Collaboration "Transverse Momentum Distribution and Nuclear Modification Factor of Charged Particles in p-Pb Collisions at $\sqrt{s_{NN}}=5.02\text{TeV}$ " (2013) Phys.Rev.Lett. Vol:110 pp:082302
27. ALICE Collaboration "Long-range angular correlations on the near and away side in p-Pb collisions at $\sqrt{s_{NN}}=5.02\text{TeV}$ " (2013) Phys.Lett. B Vol:719 pp:29-41
28. ALICE Collaboration "Charged kaon femtoscopic correlations in pp collisions at $\sqrt{s}=7\text{TeV}$ " (2013) Phys.Rev. D Vol:87 pp:052016
29. M. Ajaz, M.K. Suleymanov, K.H. Khan, A. Zaman "Searching for the properties of nuclear matter using proton-carbon and deuteron-carbon collisions at 4.2 A GeV/c " (2012) Int.J.Mod.Phys. E Vol:21 pp:1250095-1-1250095-9
30. M.K. Suleymanov, E.U. Khan, K. Ahmed, Mahnaz Q. Haseeb, Farida Tahir, Y.H. Huseynaliyev, M. Ajaz, K.H. Khan, Z. Wazir "Search for a Signal on QCD Critical Point in Central Nucleus-Nucleus Collisions " (2011) Indian J.Phys. Vol: 85 pp:1047-1050
31. B.Z. Belashev, M.K. Suleymanov, S. Vokal, J. Vrlakova, M. Ajaz, Ali Zaman, K.H. Khan, Z. Wazir "Analysis of shower particle pseudorapidity spectra in interactions of relativistic Au and Pb ions with emulsion nuclei " (2011) Chin.Phys. C Vol:35 pp:1095-1099

International Workshops

1. Workshop "X- Ray detection with a GEM" attended at CERN, Switzerland (Instructor Gabriele Croci and Matteo Alfonsi)

We learned how to Characterize GEM detector in all its aspects (gain, rate capability...) with performing some measurements using an X-Ray source.
2. Workshop "Mad Graph" attended at CERN, Switzerland (instructor Tim Stelzer from UIUC), it includes the following.
 - i) Discuss the various aspects of a hard-hadronic collision using a FLASH simulation.
 - ii) Develop cutting edge Monte Carlo techniques necessary for simulating these collisions.
 - iii) Use Mad Event's new web-based capabilities to produce event simulations for processes important to LHC physics.

References

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