Dr. Neetika

Designation: Assistant Professor
Qualification: Ph.D. (NET), M.Sc.
Specialization: High Energy Physics
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Educational Qualifications:

1. Ph.D.: High Energy Physics from Dr B R Ambedkar National Institute of Technology, Jalandhar (2006-2011)
Thesis Title: A Phenomenological Study of Quark Structure of Baryons
Supervisor: Dr. Harleen Dahiya, Department of Physics, Dr B.R. Ambedkar National Institute of Technology, Jalandhar – Punjab.

2. M.Sc. (Physics) from Panjab University, Chandigarh, India (2003-2005).

3. B.Sc. (Non-Medical) from Govt Post Graduate College Bilaspur, Himachal Pradesh University, Shimla (2000-2003).

Summary of Research work:

Recently, Light-front holography (LFH) has emerged as the semi-classical approximation for strongly-coupled field theories which provides physical insights into its nonperturbative dynamics. This approach based on AdS/CFT correspondence between the string theory on a higher-dimensional anti-de Sitter (AdS) space and conformal field theory (CFT) in physical space-time and provides a precise mapping of the string modes in the AdS fifth dimension to the hadron light-front wave functions. We have applied the same idea of matching the electromagnetic current element of AdS modes to the light-front QCD to constrain the information about the Generalized parton distributions for quarks. We have calculated the Electromagnetic form factors, Charge and magnetization densities, their DGLAP evolution in the soft wall model and light-front quark model. Further, we have used the holography based light-front wavefunction for the light vector mesons with the Color Glass Condensate dipole cross-section to predict the rate for diffractive vector meson production.

Research projects Sanctioned:

1. Research project entitled **"Diffractive vector meson production at HERA using a holographic AdS/QCD approach**" sanctioned under the **Early carrier Research Scheme, Science and Engineering Research** Board (Statutory Body Established Through an Act of Parliament), Government of India (2018) at **I.K. Gujral Punjab Technical University Kapurthala.**

2. Executed successfully the research project entitled **"The magnetic moments of N* and negative parity resonances**" sanctioned under the **Fast Track Scheme for Young Scientists, Award of Ministry of Science & Technology, Department of Science & Technology (2013-2016)** at **Indian Institute of Science Education and Research Mohali.**

List of Publications in Refereed Journals:

- **Gravitational form factors and angular momentum densities in light-front quark-diquark model**
Narinder Kumar, Chandan Mondal, Neetika Sharma
Eur. Phys. J. A 53, 237 (2017).

- **Diffractive rho and phi vector meson production at HERA using a holographic light-front wavefunction**
Mohammad Ahmady, Ruben Sandapen, and Neetika Sharma
Phys. Rev. D 94, 074018 (2016).

- **Momentum transfer dependence of generalized parton distributions**
Neetika Sharma
Eur. Phys. J. A 52, 338 (2016).

- **Hard gluon evolution of nucleon Generalized Parton Distributions in the Light-front quark model**
  Neetika Sharma
  Eur. Phys. J. A 52, 91 (2016).

- **Nucleon-generalized parton distributions in the Light-front quark model**
  Neetika Sharma
  Pramana, Journal of Physics 86, 479 (2016).

- **Generalized Parton Distributions in the soft-wall model of AdS/QCD**
  Neetika Sharma
  Phys. Rev. D 90, 095024 (2014).

- **Magnetic moments of the negative parity low lying Λ resonances**
  Neetika Sharma, A. Martinez Torres, K. P. Khemchandani, and Harleen Dahiya
  Physics of Elementary Particles and Atomic Nuclei, 45, 32 (2014).

- **Magnetic moments of the low lying $1/2^-$ octet baryon resonances**
  Neetika Sharma, A. Martinez Torres, K. P. Khemchandani, and Harleen Dahiya
  Eur. Jol. Phys. A 49, 11 (2013).

- **Charge radii of spin $(1/2)^+$ and spin $(3/2)^+$ charmed baryons in the chiral constituent quark model**
  Neetika Sharma and Harleen Dahiya
  Int. Jol. Mod. Phys. A, 28, 1350052 (2013).

- **Charge radii and quadrupole moments of the low-lying baryons in chiral constituent quark model**
  Neetika Sharma and Harleen Dahiya
  Advances in High Energy Physics, Article ID 756847, Volume 2013 (2013).

- **Magnetic moments of the low-lying $1/2^-$, $3/2^-$, Lambda resonances within the framework of the chiral quark model**
  A. Martinez Torres, K. P. Khemchandani, Neetika Sharma, and Harleen Dahiya
  Eur. Jol. Phys. A 48, 185 (2012).

- **Strangeness and chiral symmetry breaking**
  Harleen Dahiya and Neetika Sharma
  Mod. Phys. Lett. A 26, 279 (2011).

- **Quark sea asymmetries of the octet baryons**
  Neetika Sharma and Harleen Dahiya
  Phys. Rev. D 81, 114003 (2010).

- **Spin $1/2^+$, spin $3/2^+$, and transition magnetic momentum of low lying and Charmed baryons**
  Neetika Sharma, Harleen Dahiya, P.K. Chatley, and Manmohan Gupta
  Phys. Rev. D 81, 073001 (2010).

- **Extraction of CKM matrix element Vus from the hyperon semileptonic decays**
  Neetika Sharma, Harleen Dahiya, and P.K. Chatley
  Eur. Jol. Phys. A 44, 125 (2010).

- **Weak vector and axial-vector form factors in the chiral constituent quark model with configuration mixing**
  Neetika Sharma, Harleen Dahiya, P.K. Chatley, and Manmohan Gupta
  Phys. Rev. D 79, 077503 (2009).

• ***Conference Proceedings:***

- **Predictions of Diffractive phi meson production using an AdS/QCD Light front wave function**
  Mohammad Ahmady, Ruben Sandapen and Neetika Sharma
  AIP Conf. Proc. 1819, 030011 (2017).

- **Generalized Parton Distributions in impact parameter space**
  Neetika Sharma
  Paper presented at "21st International Symposium on Spin Physics (SPIN 2014)" Peking University, Beijing China (20-24 Oct, 2014)
  Int. J. Mod. Phys. Conf. Ser. 40, 1660049 (2016).

- **Diffractive phi electroproduction with a holographic meson wavefunction**
  Mohammad Ahmady, Ruben Sandapen, and Neetika Sharma
  24th International Workshop on Deep In-elastic scattering and Related subjects (DIS-2016), Hamburg Germany, (11-15 Apr, 2016).
  POS (DIS2016) 173 (2016).

- **Magnetic moments of the negative parity low lying Λ resonances**
  Neetika Sharma, Martinez Torres, K. P. Khemchandani, and Harleen Dahiya
  Paper presented at "The 20th INTERNATIONAL SYMPOSIUM on Spin Physics (SPIN2012)" JINR, Dubna, Russia (September 17-22, 2012).
  Physics of Elementary Particles and Atomic Nuclei, 45, 32-34 (2014).

- **Magnetic moment of N^* resonances in the chiral constituent quark model**
  Neetika Sharma and Harleen Dahiya
  Proceedings of XIV Advanced Research Workshop on High Energy Spin Physics (DSPIN-11), Dubna, Edited by A.V. Efremov and S.V. Goloskokov, pg. no. 135-138, (2012).

- **Nonperturbative quark sea asymmetries**
  Harleen Dahiya and Neetika Sharma
  World Scientific Conf. Proceeding 97 (2011).

- **Charge radii of octet and decuplet Baryons**
  Neetika Sharma and Harleen Dahiya
  Participated and presented paper at *International conference on the structure of baryons*, ***Baryons'10***
  Osaka, Japan (December 7-11, 2010).
  AIP Conf. Proc. 1388, 458 (2011).

- **Strangeness magnetic moments of *N* and Delta**
  Harleen Dahiya and Neetika Sharma
  Proceedings of the XIV International Conference On Hadron Spectroscopy (Hadron 2011) Kunstlerhaus, Munich, 2011, edited by B. Grube, S. Paul and N. Brambilla, eConf C110613: 534-537 (2011) [arXiv:1109.0087].

- **Strangeness and Meson-Nucleon Sigma Terms**
  Harleen Dahiya, Neetika Sharma
  AIP Conf. Proc. 1388, 439-442 (2011).

- **Charge Radii of Octet and Decuplet Baryons**
  Neetika Sharma, Harleen Dahiya
  Published in AIP Conf. Proc. 1388 (2011) 458-460

- **Chiral symmetry breaking and electromagnetic structure of the nucleon**
  Harleen Dahiya, Neetika Sharma
  AIP Conf.Proc. 1322, 445-451 (2010).

- **Quadrupole moment of the nucleon in chiral constituent quark model**
  Harleen Dahiya, Neetika Sharma
  PoS LC2010, 056 (2010).