

Profile Page



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Research Interests :

Quantum Chromodynamics views hadrons as bound states of quarks and gluons. As hadrons are made up of quarks and antiquarks, therefore, all aspects of hadronic physics is supposed to be explained through Quantum Chromodynamics. However, hadron structure studies involve non-perturbative aspects of Quantum Chromodynamics- confinement and chiral symmetry breaking which makes it a challenging task to understand. Considerable progress has been achieved through Non-Relativistic Quark Model which is based on very simple assumptions and gives a remarkable fit to many of the hadron spectroscopy data. However, starting with the observations in 1988 by the European Muon Collaboration, in the last decade or so extremely important information pertaining to spin and flavor structure of the proton have been discovered in the deep inelastic scattering experiments. The present experimental information is in contradiction with the predictions of Non-Relativistic Quark Model which referred to as ``proton spin problem".

Other Profile Links :

Google Scholar Link :

Harleen Dahiya [Click Here](#)

Personal Web Link :

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Journal Publications :

Year	Journal	Publication
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2022	Eur. Phys. J. Spec. Top.: Symmetry, Dynamics and Strings: A Centennial Issue in Honor of Yoichiro Nambu (2022)	Flavor and spin structure of the proton, Harleen Dahiya
2021	Phys. Rev. D 100, 014016 (2021)	Quark sea flavor asymmetries in the spin- $3/2^+$ decuplet baryons Harleen Dahiya
2021	J. High Energ. Phys. 2021, 136 (2021)	Light-front holographic π -meson distributions in the momentum space Satvir Kaur, Chandan Mondal, Harleen Dahiya
2021	Int. Jol. of Mod. Phys. A, Vol. 36, 2150052, (2021)	Transverse momentum-dependent parton distributions of pion in the light-front holographic model Navdeep Kaur and Harleen Dahiya
2021	Phys. Lett. B 823, 136754 (2021)	Extending light-front holographic QCD using the 't Hooft Equation Mohammad Ahmady, Harleen Dahiya, Satvir Kaur, Chandan Mondal, Ruben Sandapen and Neetika Sharma
2020	Advances in High Energy Physics, Vol. 2020, 9429631, (2020)	Study of Spin–Spin Correlations between Quark and a Spin- $1/2$ Composite System Satvir Kaur and Harleen Dahiya
2020	Eur. Phys. J. Plus 135, 422 (2020)	Decuplet baryons in nuclear and hyperonic medium Harpreet Singh, Arvind Kumar, and Harleen Dahiya
2020	Eur. Phys. J. A 56, 172 (2020)	Quark Wigner distributions and GTMDs of Pion in the light-front holographic model Navdeep Kaur and Harleen Dahiya
2020	Phys. Rev. D 102, 014021 (2020)	Tomography of light mesons in light-cone quark model Satvir Kaur, Narinder Kumar, Jiangshan Lan, Chandan Mondal, Harleen Dahiya
2020	Phys. Rev. D 102, 114027 (2020)	Singlet, triplet, and octet axial-vector form factors of the spin- $3/2^+$ decuplet baryons in the chiral quark constituent model Harleen Dahiya and Monika Randhawa
2019	Phys. Rev. D 100, 014026 (2019)	Twist-2 Pseudoscalar and Vector Meson Distribution Amplitudes in Light-Front Quark Model with Exponential-type Confining Potential Nisha Dhiman, Harleen Dahiya, Chueng-Ryong Ji, and Ho-Meoyng Choi
2019	Phys. Rev. D 100, 074008 (2019)	Study of kaon structure using the light-cone quark model Satvir Kaur and Harleen Dahiya
2019	Eur. Phys. J. Plus 134, 128 (2019)	Octet baryon masses and magnetic moments in hot and dense isospin asymmetric nuclear matter Harpreet Singh, Arvind Kumar, and Harleen Dahiya
2018	Few Body Syst. 59 (2018) 30.	Ratios of vector and pseudoscalar B meson decay constants in the light-cone quark model Nisha Dhiman, Harleen Dahiya
2018	Few Body Syst. 59 (2018) 39	Transverse momentum distributions of electron in simulated QED model Navdeep Kaur, Harleen Dahiya Few Body Syst. 59 (2018) 39.
2018	Few Body Syst. 59 (2018) 60	Study of Twist-2 GTMDs in scalar-diquark model Satvir Kaur, Harleen Dahiya
2018	Advances in High Energy Physics, Vol. 2018, 2943406 (2018)	Study of rare semileptonic $B+c \rightarrow D+??^-$ decay in the light-cone quark model Nisha Dhiman, Harleen Dahiya
2018	Eur. Phys. J. Plus 133, 134 (2018)	Decay constants of pseudoscalar and vector B and D mesons in the light-cone quark model Nisha Dhiman, Harleen Dahiya
2018	Nucl. Phys. B, 934C, 80-95 (2018)	Generalized Parton Distributions of Pion for Non-Zero Skewness in AdS/QCD Navdeep Kaur, Narinder Kumar, Chandan Mondal and Harleen Dahiya
2018	Chinese Physics C, 42(9): 93102 (2018)	Transition magnetic moments of $J^P=3/2^+$ decuplet to $J^P=1/2^+$ octet baryons in the chiral constituent quark model Harleen Dahiya.
2018	Eur. Phys. J. A 54, 120 (2018)	Magnetic moments of octet baryons in strange matter Harpreet Singh, Arvind Kumar, and Harleen Dahiya.
2018	Nucl. Phys. B 937 (2018) 272	Wigner distributions and GTMDs in a proton using light-front quark–diquark model Satvir Kaur and Harleen Dahiya
2017	Chinese Physics C, 41(9): 94104 (2017)	Magnetic moments of octet baryons in hot and dense nuclear matter Harpreet Singh, Arvind Kumar, and Harleen Dahiya.

2017	Int. Jol. of Mod. Phys. A, Vol. 32, 1750185, (2017)	Electromagnetic and Axial-Vector Form Factors of the Quarks and Nucleon Harleen Dahiya and Monika Randhawa
2016	Phys. Rev. D 93, 114030 (2016)	Nucleon structure functions and longitudinal spin asymmetries in the chiral quark constituent model
2016	Phys. Rev. D 94, 074028 (2016)	Charge and longitudinal momentum distributions in transverse coordinate space
2015	Int. Jol. of Mod. Phys. A, Vol. 30, 1550010, (2015)	Generalized Parton Distributions of proton for nonzero skewness in transverse and longitudinal position spaces Narinder Kumar and Harleen Dahiya
2015	Phys. Rev. D 92, 033012 (2015)	Magnetic moments of $J^P=3/2^+$ decuplet baryons using effective quark masses in a chiral constituent quark model
2015	Phys. Rev. D 91, 114031(2015)	Chiral Odd Generalized Parton Distributions and Spin Densities in the Impact Parameter Space
2015	Phys. Rev. D 91, 094010 (2015)	Quark flavor distribution functions for the octet baryons in the chiral quark constituent model
2015	Eur. Phys. J. A 51, 19 (2015)	Transverse distortion of a relativistic composite system in impact parameter space
2015	Eur. Phys. J. A 51, 51 (2015)	Single Transverse Spin Asymmetries in Semi-inclusive Deep Inelastic Scattering in a Spin-1 Diquark Model
2014	Phys. Rev. D 90, 094030 (2014)	Charge and magnetization densities in transverse coordinate and impact parameter space Narinder Kumar and Harleen Dahiya
2014	Phys. Rev. D 90, 074001 (2014)	Axial-vector form factors for the low lying octet baryons in the chiral quark constituent model Harleen Dahiya and Monika Randhawa
2014	Mod. Phys. Lett. A, Vol. 29, No. 24, 1450118 (2014).	Electromagnetic and gravitational form factors in simulated QED and Yukawa model Narinder Kumar, Harleen Dahiya

Book/Chapter Publications :

Type	Title	Publisher	Authors	ISBN/ISS N No.	Year
Book Chapter	Nonperturbative quark sea asymmetries	World Scientific	Harleen Dahiya and Neetika Sharma	978-98143 50181	2011
Book Chapter	What is inside the nucleon?	Narosa Publishers	Manmohan Gupta and Harleen Dahiya		2002

Research Projects :

Role	Project Type	Title	Funding Agency	From	To	Amount	Status	Co-Investigator
Principal Investigator	Sponsored Research Project	Chiral Constituent Quark Model and Proton Spin Problem	(SERC Fast Track Proposal for Young Scientists), Department of Science and Technology (DST)	February 2005	January 2008	10.31 lac	Completed	

Principal Investigator	Sponsored Research Project	Hyperon Semi-leptonic Decays in the Chiral Constituent Quark Model	Scientific Engineering and Research Council (SERC), Department of Science and Technology (DST)	August 2009	March 2013	10.69 lac	Completed	
Principal Investigator	Sponsored Research Project	Electromagnetic Structure of Hadrons at low-Q ²	Board of Research in Nuclear Sciences (BRNS), Department of Atomic Energy (DAE)	September 2010	March 2014	12.02 lac	Completed	
Principal Investigator	Sponsored Research Project	Generalized and Transverse Momentum Dependent Parton Distributions	Scientific Engineering and Research Board (SERB), Department of Science and Technology (DST)	November 2014	October 2017	13.32 lac	Completed	
Principal Investigator	Sponsored Research Project	Semi-leptonic, radiative and non-leptonic rare B decays in the light front quark model	Scientific Engineering and Research Board (SERB), Department of Science and Technology (DST)	July 2018	June 2021	18.85 lac	Completed	
Principal Investigator	Sponsored Research Project	Study Of Generalized Transverse Momentum-Dependent Distributions And Wigner Distributions Of Parton	Scientific Engineering and Research Board (SERB), Department of Science and Technology (DST)	Feb-2020	Feb 2023	6,60,000	Ongoing	

Mentor	Sponsored Research Project	Demystifying the Internal and Spin Structure of Proton	Scientific Engineering and Research Board (SERB), Department of Science and Technology (DST)	Feb-2022	Feb 2025	18,30,000	Ongoing	Dr. Narinder Kumar
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Events Organized :

Category	Type	Title	Venue	From	To	Designation
STC	National	Quark Model	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	22-04-2013	26-04-2013	Coordinator
STC	National	Emerging trends in Physics and Information Technology	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	10-06-2013	12-06-2013	Coordinator
STC	National	Quantization of Fields	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	18-11-2013	29-11-2013	Coordinator
STC	National	Nuclear, Statistical Physics and Quark Model and their Applications	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	14-03-2014	18-03-2014	Coordinator
Workshop	International	Training Workshop on the Detector and Physics Simulation for PANDA (PANDATRG2014)	Sardar Patel University, Vallabh Vidyanagar	18-03-2014	20-03-2014	Member Organizing Committee
Seminar	National	Neutrino Physics-A Historical Perspective	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	03-09-2014	03-09-2014	Coordinator
Conference	National	19th National Conference on Solid State Nuclear Track Detectors and Their Applications	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	19-11-2015	21-11-2015	Member Organizing Committee
STC	National	Advances in Nuclear and Particle Physics: Present and Future	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	08-02-2016	12-02-2016	Coordinator
STC	National	Advances in Material Science and Material Engineering	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	08-08-2016	14-08-2016	Member Organizing Committee

STC	National	Recent Trends in Nanostructured Materials	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	19-09-2016	23-09-2016	Member Organizing Committee
Seminar	National	Science and Inclusive Development	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	18-02-2019	18-02-2019	Coordinator
Seminar	National	Mysterious Neutrinos: Ultimate Probing Tool of Nature	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	11-04-2019	11-04-2019	Coordinator
Conference	National	1st National Conference on Innovations in Applied Science and Engineering	Dr. B.R. Ambedkar National Institute of Technology, Jalandhar	27-04-2019	28-04-2019	Patron

PhD Supervised :

Scholar Name	Research Topic	Status	Year	Co-Supervisor
Navpreet Kaur		Ongoing	2022	
Satyajit Puan		Ongoing	2022	
Nisha Dhiman	STUDY OF B DECAYS AND PHYSICS BEYOND THE STANDARD MODEL	Completed	2021	
Navdeep Kaur	STUDY OF TRANSVERSE MOMENTUM DEPENDENT PARTON DISTRIBUTION FUNCTIONS USING LIGHT-FRONT DYNAMICS	Completed	2021	
Satvir Kaur	STUDY OF GENERALIZED TRANSVERSE MOMENTUM-DEPENDENT PARTON DISTRIBUTIONS USING LIGHT-FRONT DYNAMICS	Completed	2021	
Harpreet Singh	MAGNETIC MOMENTS OF HADRONS AT FINITE DENSITY AND TEMPERATURE OF MEDIUM	Completed	2020	Dr. Arvind Kumar
Shubham Sharma		Ongoing	2019	
Narinder Kumar	STUDY OF GENERALIZED PARTON DISTRIBUTIONS USING LIGHT-FRONT DYNAMICS	Completed	2016	
Aarti Girdhar	STUDIES ON THE BEHAVIOUR OF QUARKS - KNOWN AND UNKNOWN	Completed	2016	Prof. Biswarup Mukhopadhyaya

PG Dissertation Guided :

Student Name	Dissertation Title	Status	Year	Co-Supervisor
Pranjal Srivastava	Reconstruction of B-meson	Completed	2022	
Shweta Choudhary	u-bar d-bar asymmetry in proton	Completed	2022	

Admin. Responsibilities :

Position Held	Organization	From	To
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Head of Department	Physics	24-01-2019	03-02-2021
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Award and Honours :

Title	Activity	Given by	Year
Distinguished Young Scientist	Research	Indo-U.S. Science and Technology Forum (IUSSTF) and the U.S. National Academy of Sciences.	2015
Young Scientist Award	Research	DST	2005
DST Award	Meeting of Nobel Laureates and Students in Lindau (Germany)	DST	2004
Research Associateship	Postdoctoral Research	CSIR	2004
Research Fellowship	Research	CSIR	1999