RASHIDUL ISLAM ~ *Curriculum Vitae*

Department of Physics
Mathabhanga College
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Date of Birth: May 22, 1981
Gender: Male
Nationality: Indian
Language spoken: Bengali, English, Hindi

CURRENT POSITION

Assistant Professor, Mathabhanga College — January 2020 to present

PREVIOUS POSITIONS

Research Associate, Indian Institute of Technology Guwahati — August 2016 – March 2019
Postdoctoral Fellow, University of Calcutta — January 2014 – January 2016

TEACHING EXPERIENCE

- *Course Instructor for B.Sc Physics (Hons) students*, Mathabhanga College, Cooch Behar
  - ◇ Kinetic Theory of Gases : 3rd Semester
  - ◇ Elements of Modern Physics : 4th Semester
  - ◇ Quantum Mechanics and Applications : 5th Semester
  - ◇ Nuclear and Particle Physics : 6th Semester
  - ◇ Statistical Mechanics : 6th Semester
- *Tutor for first year B.Tech students*, Indian Institute of Technology Guwahati
  - ◇ Spring Semester, January – April 2018
  - ◇ Fall Semester, August – September 2018

EDUCATION

- *Ph.D*, Theoretical Particle Physics, May 2015
  Department of Physics & Astrophysics, University of Delhi
  - ◇ Thesis Title: *Constraints on New Physics in the Higgs and Top Sector*
- *National Eligibility Test (NET)*, Physical Sciences December 2008
  - ◇ Qualified for CSIR Junior Research Fellowship, joined University of Delhi for Ph.D
- *M.Sc*, Physical Sciences August 2007
  S N Bose National Centre for Basic Sciences
- *Joint Entrance Screening Test (JEST)* February 2005
  - ◇ Ranked 68, joined S N Bose National Centre for Basic Sciences for Integrated Ph.D
- *B.Sc*, Physics (Hons), Mathematics and Chemsitry August 2004
  Maulana Azad College, University of Calcutta

RESEARCH INTERESTS

- *Evidence of new physics in the Higgs and top quark:* My primary interest is in the probe of Higgs and top couplings in the present as well as the upcoming colliders suitable for the precision measurements.
- *QCD phenomenology:* I applied tranverse mass dependent (TMD) factorization to explain the QCD effects in the colliders.
- *Dark matter phenomenology:* My most recent endeavour is in the search for dark matter in the collider environments. I intend to apply novel techniques to develop new search strategies. These techniques include Deep Learning, however it not solely dependent on it.

iNSPIRE HEP Author Identifier : R.Islam.1

RESEARCH SKILLS

- Programming with FORTRAN, C++, Mathematica and Linux Shell script.
- To implement a user model (given Lagrangian) using FeynRules/SARAH/LanHEP, which serves as input model file for MadEvent, CalcHep, Whizard and Sherpa event generators.
- MadEvent and CalcHep event generators.
- Analytical calculations using MATHEMATICA and FORM.
- ROOT based analysis using BDT.

RESEARCH PROJECTS

- Teachers Associateship for Research Excellence (TARE) December 2020 – December 2023
  - ◇ Principal Investigator.
  - ◇ Sponsored by Science and Engineering Research Board (SERB), Government of India.
  - ◇ Ref no. TAR/2020/000448.
  - ◇ 3 years project starting from Dec 14, 2020.
  - ◇ Sanctioned amount ∼ Rs. 18,30,000.

PUBLICATIONS

(Note: The convention in High Energy Physics community is to put the authors in alphabetic order of their surname.)

[1] S. Chakraborti and R. Islam, *Implications of dark sector mixing on leptophilic scalar dark matter*, J. High Energy Phys. **03**, 032 (2021).

[2] S. Chakraborti and R. Islam, *Multilepton signatures for scalar dark matter searches in coannihilation scenario*, Phys. Rev. D **101**, 115034 (2020).

[3] A. Goyal, R. Islam, and M. Kumar, *Dark matter in the Randall-Sundrum model with non-universal coupling*, J. High Energy Phys. **10**, 050 (2019).

[4] S. Behera, R. Islam, M. Kumar, P. Poulose, and R. Rahaman, *Fingerprinting the Top quark FCNC via anomalous Ztq couplings at the LHeC*, Phys. Rev. D **100**, 015006 (2019).

[5] S. Chakraborti, A. Dutta Banik, and R. Islam, *Probing Multicomponent Extension of Inert Doublet Model with a Vector Dark Matter*, Eur. Phys. J. C **79**, 662 (2019).

[6] R. Islam, M. Kumar, and V. S. Rawoot, *k_T-factorization approach to the Higgs boson production in $ZZ^* \to 4\ell$ channel at the LHC*, Eur. Phys. J. C **79**, 181 (2019).

[7] S. Ghosh, R. Islam, and A. Kundu, *Scattering unitarity with effective dimension-6 operators*, J. Phys. G **45**, 015003 (2018).

[8] M. Kumar, X. Ruan, R. Islam, A. S. Cornell, M. Klein, U. Klein, and B. Mellado, *Probing anomalous couplings using di-Higgs production in electron–proton collisions*, Phys. Lett. B **764**, 247 (2017).

[9] M. Dahiya, S. Dutta, and R. Islam, *Investigating perturbative unitarity in the presence of anomalous couplings*, Phys. Rev. D **93**, 055013 (2016).

[10] D. Choudhury, R. Islam, and A. Kundu, *Anomalous Higgs Couplings as a Window to New Physics*, Phys. Rev. D **88**, 013014 (2013).

[11] M. Dahiya, S. Dutta, and R. Islam, *Constraining Unparticles from Top Physics at TeVatron*, Phys. Rev. D **86**, 115022 (2012).

REPORTS

[12] P. Agostini et al. (LHeC, FCC-he Study Group), *The Large Hadron-Electron Collider at the HL-LHC*, (July 2020) arXiv:2007.14491 [hep-ex].

[13] A. Abada et al. (FCC), *HE-LHC: The High-Energy Large Hadron Collider: Future Circular Collider Conceptual Design Report Volume 4*, Eur. Phys. J. ST **228**, 1109 (2019).

[14] A. Abada et al. (FCC), *FCC-hh: The Hadron Collider: Future Circular Collider Conceptual Design Report Volume 3*, Eur. Phys. J. ST **228**, 755 (2019).

[15] A. Abada et al. (FCC), *FCC-ee: The Lepton Collider: Future Circular Collider Conceptual Design Report Volume 2*, Eur. Phys. J. ST **228**, 261 (2019).

[16] A. Abada et al. (FCC), *FCC Physics Opportunities: Future Circular Collider Conceptual Design Report Volume 1*, Eur. Phys. J. C **79**, 474 (2019).

CONFERENCE PROCEEDINGS

[17] M. Kumar, A. Goyal, and R. Islam, *Dark matter in the Randall-Sundrum model*, in "64th Annual Conference of the South African Institute of Physics" (Aug. 2019), arXiv:1908.10334 [hep-ph].

[18] V. S. Rawoot, R. Islam, and M. Kumar, *Differential cross section for the Higgs boson production in 4-lepton channel and k_T-factorization*, Proc. Sci. **QCDEV2016**, 048 (2017).

[19] M. Kumar, X. Ruan, A. S. Cornell, R. Islam, and B. Mellado, *Double Higgs production at FCC-he and prospects for measurements of self-coupling*, J. Phys. Conf. Ser. **623**, 012017 (2015).

[20] D. Ghosh et al., *Working group report: Physics at the Large Hadron Collider*, Pramana **76**, edited by A. S. Joshipura, S. Mohanty, and S. D. Rindani, 707 (2011).

[21] A. S. Joshipura, S. Roy, and S. U. Sankar, *Working group summary: Neutrinos and beyond standard model*, Pramana **76**, edited by A. S. Joshipura, S. Mohanty, and S. D. Rindani, 699 (2011).

CONFERENCE TALKS/POSTERS/SEMINARS

- *Invited seminar*,
  Indian Institute of Technology Guwahati — September 13, 2017
  Title: *kT-factorization approach to the Higgs boson production at the LHC*
- *Invited seminar*,
  University of Calcutta, Kolkata — December 12, 2013
  Title: *Unitarizing Gauge Boson Scattering in Light Higgs Scenarios*
- *XX DAE-BRNS High Energy Physics Symposium*,
  Visva-Bharati University, Santiniketan — August 24 - 26, 2012
  Title: *Constraints on Unparticles from Top Properties Measured at TeVatron*
- *Top-Higgs Meeting*,
  Indian Institute of Science, Bangalore — January 13 - 18, 2013
  Title: *Constraints on Unparticles from Top Properties Measured at TeVatron*
- *IPMU-YITP School and Workshop on Monte Carlo Tools for LHC*,
  Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, Japan — September 05 - 10, 2011
  Title: *A_{FB} and Spin Correlation of $t\bar{t}$ in Unparticle Physics*

REFERENCES

- Prof. Poulose Poulose,
  Professor, Department of Physics, Indian Institute of Technology Guwahati,
  North Guwahati, Amingaon, Guwahati, Assam 781 039, India
  E-mail: poulose@iitg.ac.in
- Prof. Ashok Goyal,
  Emeritus Scientist, CSIR
  University of Delhi (North Campus), Delhi 110007
  E-mail: agoyal45@yahoo.com
- Prof. Anirban Kundu,
  Professor, Department of Physics, University of Calcutta,

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- Dr. Sukanta Dutta,
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