



RAFIQUL RAHAMAN

Curriculum Vitae

Regional Centre for Accelerator based Particle Physics - RECAPP
Harish-Chandra Research Institute,
Chhatnag Rd, Jhusi, Uttar Pradesh 211019, India ☎ +91 7872928441
skype: rahaman.rafiqul
✉ rafiquerahaman@hri.res.in, ✉ rahaman.rafiqul786@gmail.com

Present Status

Postdoctoral Fellow, October 2020 to present, RECAPP, Harish-Chandra Research Institute, India

Qualification

Ph.D., *IISER Kolkata*, INDIA.

Research Interests

Beyond the Standard Model phenomenology at present and future collider

- Effective field theory,
- Anomalous gauge boson, Higgs to gauge boson and Higgs self-couplings,
- Polarization/spin observables of spin-1 (Z , W^\pm) and spin-1/2 (t) particles,
- Role of beam polarization at the ILC, CEPC, SPPC and LHeC,
- Phenomenology of Higgs boson physics, supersymmetry, extra dimension and dark matter.

Research Skills

- Helicity amplitude calculation of scattering processes,
- Bayesian statistics for Significance and Confidence Interval (BCI),
- Monte-Carlo samplings and Markov-Chain–Monte-Carlo (MCMC),
- Basic loop calculation,
- Machine learning (artificial neural network (ANN), auto-encoder, classification, boosted decision tree (BDT)).

Computational Skills

Languages C, C++, FORTRAN, Python.

HEP Packages MadGraph5, CalcHEP, MATRIX, MCFM, FeynRules, FeynCalc, FeynArts, FormCalc,
microMEGA, FORM, MadAnalysis5, Pythia, Delphes, Root, GetDist.

General Packages Mathematica, Matlab, Octave, gnuplot, Matplotlib, \LaTeX .

OS Windows, Linux, Mac

Academic Backgrounds

2014–2020 **Ph.D.**, *IISER Kolkata*, INDIA.

Thesis ***Study of anomalous gauge boson self-couplings and the role of spin-1 polarizations***

Advisor Dr. Ritesh K. Singh

2011–2013 **Masters of Science in Physics**, *IIT Bombay, Mumbai*, INDIA.

Master Thesis ***Top quark Forward Backward Asymmetry at the Tevatron***

Supervisor Dr. Kumar Rao

2008–2011 **Bachelor of Science in Physics (Honours)**, *University of Calcutta, Kolkata*, INDIA.

Schools attended

- 1 SERC Preparatory School in “Theoretical High Energy Physics” at Indian Institute of Science Education and Research Bhopal, India during June-July 2015.
- 2 Saha theory workshop on “Multi-loop and multi-leg processes for precision physics at the LHC” at SINP, India during February 23-27, 2016.
- 3 “Mini School on Effective Field Theory”, at IACS, India during February 29-March 4, 2016.
- 4 SERC Main School in “Theoretical High Energy Physics” at the University of Kalyani, India during January 2017.
- 5 GIAN course on “Electroweak Symmetry Breaking, Flavour Physics and BSM” at IIT Guwahati, India during December 18-22, 2017.

Conference, Workshop attended and/or Talk, Poster presented

- 1 Attended national Conference on “Current Trends in Particle Physics Research”, at University of Kalyani, India during March 13-15, 2014.
- 2 **Departmental seminar presented** on “On polarization parameters of spin-1 particles and anomalous couplings in $ZZ/Z\gamma$ production at ILC” at IISER Kolkata, India on 27th April, 2016.
- 3 Attended workshop on “Physics at the LHC RunII to discuss about the latest LHC results and prospects for future with more data coming in” at SINP, India on August 26, 2016.
- 4 **Poster presented** on “Polarization parameters of spin-1 particle and anomalous couplings in $e^+e^- \rightarrow ZZ/Z\gamma$ ” in the Conference on “Current Trends in Modern Physics” at IISER Kolkata, India on 5th November, 2016.
- 5 Visit to Regional Centre for Accelerator-based Particle Physics (RECAPP), Harish-Chandra Research Institute, Allahabad, India on “Meeting on theoretical and experimental particle physics” during February 4 - 17, 2017.
- 6 Attended workshop on “Collider Physics: Events, Analysis and QCD” at IIT Guwahati, India during 27-31 March, 2017.
- 7 **Poster presented** on “Spin observables and anomalous gauge boson couplings at e^+e^- collider” at IISER Kolkata, India on 13th January 2018.
- 8 Participated in “Workshop on Top Quark Physics at Present and Future Colliders” at IISER Kolkata, India during 27-30 January, 2018.
- 9 Attended “Second Workshop of the Indo-French Network in High Energy Physics” at IISER Pune, India during 24-28 February, 2018.

- 10 **Seminar presented** on “Constraining anomalous gauge boson couplings in $e^+e^- \rightarrow W^+W^-$ using polarization asymmetries with polarized beams”, APS April meeting 2018, April 17, 2018, at Columbus, Ohio, USA.
- 11 **Seminar presented** on “On polarization parameters of spin-1 particles and anomalous triple gauge boson couplings”, April 18, 2018 in Pitts-PAC, University of Pittsburgh, Pittsburgh, USA.
- 12 Meeting attended “Is SUSY still the best bunker to hide in, in light of experimental data?”, 10-13 May, 2018 in Centre For High Energy physics Indian Institute of Science, Bengaluru, India.
- 13 Visit to LPT Orsay in the framework of CEFIPRA Indo-French network, 01-20 September, 2018, LPT Orsay, France.
- 14 **Poster presented** on “On anomalous triple gauge boson couplings in ZZ production at LHC with Z boson spin observables” in the “International Meeting on High Energy Physics - 2019 ” held at IOP Bhubaneswar, India during 17-22 January 2019.
- 15 **Seminar presented** on “On anomalous triple gauge boson couplings in ZZ production at the LHC with Z boson spin observables”, at IISER Kolkata, India on 25th February 2019.
- 16 Visit to Regional Centre for Accelerator-based Particle Physics (RECAPP), Harish-Chandra Research Institute, Allahabad, India on RECAPP activity, during March 8 - 14, 2019.
- 17 Attended “International Workshop on Precision QCD @LHC” at IIT Hyderabad, India during 28-31 January, 2020.

Teaching experiences

- 1 Teaching Assistant for master level students for “Computational Physics” course at IISER Kolkata, India, August - December 2016.
- 2 Teaching Assistant for master level students for “High Energy Physics” course at IISER Kolkata, India, January - May 2017.
- 3 Teaching Assistant for master level students for “Basics of Field Theory and Relativistic Quantum Mechanics” course at IISER Kolkata, India, August - December 2017.
- 4 Teaching Assistant for master level students for “Quantum Field Theory II” course at IISER Kolkata, India, January - May 2018.

Awards

- Got **INSPIRE Fellowship** for Doctor of Philosophy in 2014,
- Got **Bhabesh Gandhi Memorial Prize** in M.Sc from IIT Bombay for best master thesis (2013),
- Secured All India Rank 241 in JEST 2013,
- Secured All India Rank 381 in GATE 2013,
- Got **INSPIRE-DST SCHOLARSHIP** in M.Sc (2011 to 2013),
- Secured All India Rank 44 in JAM in 2011,
- Secured All India Rank 142 in JEST 2011.
- Got **INSPIRE-DST SCHOLARSHIP** in B.Sc (2008 to 2011),

Personal details

Date of Birth : 20th April, 1989
 Place of Birth : Mathabhanga, Cooch Behar, West Bengal (India)
 Gender : Male
 Nationality : Indian