

Aqeel Ahmed



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EMPLOYMENT	◆ Postdoc [current position] Max-Planck-Institut für Kernphysik , Heidelberg, Germany (Parental leave: Jul 2025 – Nov 2025)	since Oct 2020
	◆ Postdoc Vrije Universiteit Brussel (VUB) , Brussels, Belgium	Oct 2018 – Sep 2020
	◆ Postdoc (MITP & PRISMA Cluster of Excellence) Johannes Gutenberg University , Mainz, Germany	Dec 2017 – Sep 2018
	◆ Research Associate University of Warsaw , Warsaw, Poland	Apr 2016 – Nov 2017
EDUCATION	◆ Ph.D. Physics University of Warsaw , Warsaw, Poland <i>Visiting Student:</i> University of California, Riverside, USA (1 year) University of California, Davis, USA (6 months) <i>Thesis:</i> “ <i>Scalar fields within warped extra-dimension</i> ” <i>Advisor:</i> Prof. Bohdan Grzadkowski	Dec 2011 – Jan 2016
	◆ M.Sc. & M.Phil Physics Quaid-i-Azam University , Islamabad, Pakistan <i>Thesis:</i> “ <i>Analysis of discrete symmetries in b-baryon decays</i> ” <i>Advisor:</i> Prof. Riazuddin	Feb 2006 – Apr 2010
RESEARCH SUMMARY	I am interested in theoretical particle physics and cosmology, particularly model building and phenomenological aspects of physics beyond the Standard Model. I have worked on dark matter, neutral naturalness, dynamical solutions to the hierarchy problem, warped extra dimensions, composite/holographic Higgs models, flavor physics, baryo/leptogenesis, and early universe cosmology. As of December 2025, my work has received over 900 citations with an h-index of 14.	
PROFESSIONAL ACTIVITIES	◆ Mentoring: Co-supervised 10+ Masters/PhD students during my research career ◆ Organizer: I have helped organize 10+ international conferences and workshops ◆ Refereeing: Journal of High Energy Physics (JHEP), Physical Review D (PRD), European Physical Journal C (EPJC), and Advances in High Energy Physics ◆ Representative: Postdoc representative and convener of <i>be-h project</i> (www.be-h.be), Belgium	
TEACHING	◆ Teaching Assistant at the University of Heidelberg <i>Standard Model of Particle Physics</i>	2024
	◆ Teaching at Vrije Universiteit Brussel <i>Statistical Physics</i>	2019 – 2020
	◆ Teaching Assistant at Quaid-i-Azam University <i>Quantum Field Theory, Particle Physics and Group Theory</i>	2009 – 2011

PUBLICATIONS

- [1] A. Ahmed, Z. Chacko, N. Desai, S. Doshi, C. Kilic, S. Najjari and R. P. R. Sudha, “Long-Lived-Particle Signals of a Composite Hidden Sector through the Neutrino Portal,” [arXiv:2512.09046](#)
- [2] A. Ahmed, J. P. Garcés and M. Lindner, “Primordial Dirac Leptogenesis,” [arXiv:2511.03794](#)
- [3] A. Ahmed, J. P. Garcés and M. Lindner, “Radiative symmetry breaking with a scale invariant seesaw mechanism,” *Phys. Rev. D* **112** (2025) no.3, 035026 [[arXiv:2504.13243](#)].
- [4] A. Ahmed, Z. Chacko, I. Flood, C. Kilic and S. Najjari, “General form of effective operators from hidden sectors,” *JHEP* **05** (2025) 167 [[arXiv:2412.15067](#)].
- [5] A. Ahmed, M. Lindner and P. Saake, “Conformal little Higgs models,” *Phys. Rev. D* **109** (2024) no.7, 075041 [[arXiv:2309.07845](#)].
- [6] A. Ahmed, Z. Chacko, N. Desai, S. Doshi, C. Kilic and S. Najjari, “Composite Dark Matter and Neutrino Masses from a Light Hidden Sector,” *JHEP* **07** (2024) 260 [[arXiv:2305.09719](#)].
- [7] A. Ahmed, B. Grzadkowski and A. Socha, “Higgs boson induced reheating and ultra-violet frozen-in dark matter,” *JHEP* **02** (2023) 196 [[arXiv:2207.11218](#)].
- [8] A. Ahmed, B. Grzadkowski and A. Socha, “Higgs Boson-Induced Reheating and Dark Matter Production,” *Symmetry* **14** (2022) no.2, 306.
- [9] A. Ahmed and S. Najjari, “Ultraviolet freeze-in dark matter through the dilaton portal,” *Phys. Rev. D* **107** (2023) no.5, 055020 [[arXiv:2112.14261](#)].
- [10] A. Ahmed, B. Grzadkowski and A. Socha, “Implications of time-dependent inflaton decay on reheating and dark matter production,” *Phys. Lett. B* **831** (2022) 137201 [[arXiv:2111.06065](#)].
- [11] A. Ahmed, B. Grzadkowski and A. Socha, “*Gravitational production of vector dark matter*”, *JHEP* **08** (2020) 059 [[arXiv:2005.01766](#)].
- [12] A. Ahmed, S. Najjari and C. B. Verhaaren, “*A Minimal Model for Neutral Naturalness and pseudo-Nambu-Goldstone Dark Matter*”, *JHEP* **06** (2020) 007 [[arXiv:2003.08947](#)].
- [13] A. Ahmed, A. Mariotti and S. Najjari, “*A light dilaton at the LHC*”, *JHEP* **05** (2020) 093 [[arXiv:1912.06645](#)].
- [14] A. Ahmed, B. M. Dillon and S. Najjari, “*Dilaton portal in strongly interacting twin Higgs models*”, *JHEP* **02** (2020) 124 [[arXiv:1911.05085](#)].
- [15] A. Ahmed, A. Carmona, J. Castellano-Ruiz, Y. Chung and M. Neubert, “*Dynamical origin of fermion bulk masses in a warped extra dimension*”, *JHEP* **08** (2019) 045 [[arXiv:1905.09833](#)].
- [16] A. Ahmed, “*Heavy Higgs of the Twin Higgs Models*”, *JHEP* **02** (2018) 048 [[arXiv:1711.03107](#)].
- [17] A. Ahmed, M. Duch, B. Grzadkowski and M. Iglicki, “*Multi-Component Dark Matter: the vector and fermion case*”, *Eur. Phys. J. C* **78**, no.11 (2017) 905 [[arXiv:1710.01853](#)].
- [18] A. Ahmed and B. M. Dillon, “*Clockwork Goldstone Bosons*”, *Phys. Rev. D* **96** no. 11, (2017) 115031 [[arXiv:1612.04011](#)].
- [19] A. Ahmed, B. M. Dillon, B. Grzadkowski, J. F. Gunion, Y. Jiang, “*Implications of the absence of high-mass radion signals*”, *Phys. Rev. D* **95** no. 9, (2017) 095019 [[arXiv:1512.05771](#)].
- [20] A. Ahmed, B. Grzadkowski, J. F. Gunion and Y. Jiang, “*Higgs Dark Matter from a Warped Extra-Dimension – the truncated-inert-doublet model*”, *JHEP* **10** (2015) 033 [[arXiv:1504.03706](#)].
- [21] A. Ahmed, L. Dulny and B. Grzadkowski, “*Generalized Randall-Sundrum model with a single thick brane*”, *Eur. Phys. J. C* **74** (2014) 2862 [[arXiv:1312.3577](#)].

- [22] A. Ahmed, B. Grzadkowski and J. Wudka, “*Thick-Brane Cosmology*”, *JHEP* **04** (2014) 061 [arXiv:1312.3576].
- [23] A. Ahmed and B. Grzadkowski, “*Brane modeling in warped extra-dimension*”, *JHEP* **01** (2013) 177 [arXiv:1210.6708].
- [24] A. Ahmed, I. Ahmed, M. J. Aslam, M. Junaid, M. A. Paracha and A. Rehman, “*Fourth-generation standard model imprints in $B \rightarrow K^* \ell^+ \ell^-$ decays with polarized K^** ”, *Phys. Rev.* **D85** (2012) 034018 [arXiv:1110.4259].
- [25] A. Ahmed, I. Ahmed, M. A. Paracha, M. Junaid, A. Rehman and M. J. Aslam, “*Comparative Study of $B_c \rightarrow D_s^* \ell^+ \ell^-$ Decays in Standard Model and Supersymmetric Models*”, arXiv:1108.1058.
- [26] I. Ahmed, M. A. Paracha, M. Junaid, A. Ahmed, A. Rehman and M. J. Aslam, “*Analysis of $B_c \rightarrow D_s^* \ell^+ \ell^-$ in the Standard Model Beyond Third Generation*”, arXiv:1107.5694.
- [27] A. Ahmed, I. Ahmed, M. A. Paracha and A. Rehman, “ *$K_1(1270)$ - $K_1(1400)$ mixing and the fourth generation SM effects in $B \rightarrow K_1 \ell^+ \ell^-$ decays*”, *Phys. Rev.* **D84** (2011) 033010 [arXiv:1105.3887].

PROCEEDINGS

- [28] A. Ahmed, B. Grzadkowski and A. Socha, “*Production of Purely Gravitational Vector Dark Matter*”, *Acta Phys. Polon.* **B50** (2019) 1809.
- [29] A. Ahmed, M. Duch, B. Grzadkowski and M. Iglicki, “*Vector-Fermion Dark Matter Model*”, *Acta Phys. Polon.* **B48** no. 12, (2017) 2405.
- [30] A. Ahmed, B. Grzadkowski, J. F. Gunion and Y. Jiang, “*Higgs Dark Matter from a Warped Extra-Dimension*”, *PoS PLANCK* **2015** 002 [arXiv:1510.05722].
- [31] A. Ahmed, B. Grzadkowski, J. F. Gunion and Y. Jiang, “*Radius stabilization and dark matter with a bulk Higgs in warped extra dimension*”, *Acta Phys. Polon.* **B46** no. 11, (2015) 2205, [arXiv:1510.04116].
- [32] A. Ahmed, L. Dulny and B. Grzadkowski, “*Modeling branes in warped extra-dimension*”, *Acta Phys. Polon.* **B44** no. 11, (2013) 2381.

SELECTED
TALKS

- | | |
|--|---|
| <ul style="list-style-type: none"> ◊ <i>Primordial Dirac Leptogenesis</i> ITP, University of Heidelberg, Heidelberg ◊ <i>Conformal Dark Sectors</i> Pushing the Limits of Theoretical Physics, MITP, Mainz ◊ <i>Dark Side of the Universe</i> A Decade of Discoveries in High-Energy Physics, Brussels ◊ <i>Composite Dark Matter and Neutrino Masses from a Light Hidden Sector</i> Seminar at the University of Warsaw (Dec 2021) and THEP Mainz (Jan 2022) ◊ <i>Gravitational Production of Vector Dark Matter</i> Teilchen-Tee ITP Heidelberg and MPIK Theory Seminar ◊ <i>A Minimal Model for Neutral Naturalness and pNGB Dark Matter</i> CERN Theory BSM forum (online) ◊ <i>Dilaton portal to composite twin Higgs</i> SCALARS 2019, Warsaw, Poland ◊ <i>Neutral Naturalness at the LHC</i> PLANCK 2019, Granada, Spain ◊ <i>A light scalar window at the LHC</i> EoS be.h meeting, Brussels, Belgium ◊ <i>Neutral Naturalness at the LHC</i> | June 2025
May 2023
Mar 2023
Jan 2021
Apr 2020
Sep 2019
Jun 2019
Jun 2019
Dec 2018 |
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Winter Solstice Meeting, Brussels, Belgium

- ◊ *Clockwork Mechanism: A 4D/5D perspective on BSM model building* Nov 2018
MPIK seminar, Heidelberg, Germany
- ◊ *Exploring the Scalar Sector of the Twin Higgs Models* Dec 2017
SCALARS 2017, Warsaw, Poland
- ◊ *Clockwork Theory: a proposal to generate hierarchies* May 2017
University of Montpellier, Montpellier, France
- ◊ *Multi-component dark matter scenarii: vector-fermion case* May 2017
PLANCK 2017, Warsaw, Poland
- ◊ *Multi-component dark matter: vector-fermion case* Dec 2016
DISRETE 2016, Warsaw, Poland
- ◊ *Clockwork Composite Higgs* Nov 2016
THEP & MITP seminar, Mainz, Germany
- ◊ *750 GeV resonance: a messenger from warped extra dimensions?* May 2016
Seminar, University of Warsaw, Warsaw, Poland
- ◊ *Higgs-Radion phenomenology at LHC13* Jan 2016
Niels Bohr Institute, Copenhagen, Denmark
- ◊ *Higgs-radion phenomenology and dark matter in warped extra dimensions* Jan 2016
CP³ – Origins, Odense, Denmark
- ◊ *Higgs-Radion Unification in Warped Extra Dimension* Dec 2015
SCALARS 2015, Warsaw, Poland
- ◊ *Radius stabilization and dark matter with a bulk Higgs in RS model* Sep 2015
XXXIX International Conference of Theoretical Physics, Ustroń, Poland
- ◊ *Higgs dark matter from a warped extra-dimension* May 2015
PLANCK 2015, Ioannina, Greece
- ◊ *Colloquium: A case for large extra-dimensions* Aug 2014
Mimar Sinan University, Istanbul, Turkey
- ◊ *Thick Brane Cosmology* Jul 2014
SUSY 2014, Manchester, UK
- ◊ *Cosmology with thick branes* Jun 2014
PASCOS 2014, Warsaw, Poland
- ◊ *Modeling branes in warped extra-dimension with scalar fields* Sep 2013
SCALARS 2013, Warsaw, Poland
- ◊ *Modeling branes in warped extra-dimension* Sep 2013
XXXVII International Conference of Theoretical Physics, Ustroń, Poland
- ◊ *Thick Branes in Warped Extra Dimensions* Oct 2012
Physics Department Seminar, University of California, Riverside, USA

- DISTINCTIONS
- ◆ International PhD Projects Program Fellowship, 2011 – 2015
Foundation for Polish Science co-financed by the EU Regional Fund
 - ◆ Pro-quality Scholarship, University of Warsaw 2011 – 2012
 - ◆ Chancellor Gold Medal (M.Phil), Quaid-i-Azam University 2010
 - ◆ Riazuddin Fellowship in Particle Physics (M.Phil) 2008 – 2009

- SKILLS
- ◊ *Programming:* Python, C/C++, Fortran, Wolfram Mathematica
 - ◊ *Languages:* English (Fluent), German (Intermediate, B1)