

# Aqeel Ahmed

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EMPLOYMENT	<ul style="list-style-type: none"><li>♦ Postdoc Oct 2020 – Dec 2025 <b>Max-Planck-Institut für Kernphysik</b>, Heidelberg, Germany (Parental leave: Jul 2025 – Nov 2025)</li><li>♦ Postdoc Oct 2018 – Sep 2020 <b>Vrije Universiteit Brussel</b> (VUB), Brussels, Belgium</li><li>♦ Postdoc (MITP &amp; PRISMA Cluster of Excellence) Dec 2017 – Sep 2018 <b>Johannes Gutenberg University</b>, Mainz, Germany</li><li>♦ Research Associate Apr 2016 – Nov 2017 <b>University of Warsaw</b>, Warsaw, Poland</li></ul>
EDUCATION	<ul style="list-style-type: none"><li>♦ Ph.D. Physics Dec 2011 – Jan 2016 <b>University of Warsaw</b>, 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</li><li>♦ M.Sc. &amp; M.Phil Physics Feb 2006 – Apr 2010 <b>Quaid-i-Azam University</b>, Islamabad, Pakistan <i>Thesis:</i> “<i>Analysis of discrete symmetries in b-baryon decays</i>” <i>Advisor:</i> Prof. Riazuddin</li></ul>
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	<ul style="list-style-type: none"><li>♦ <b>Mentoring:</b> Co-supervised 10+ Masters/PhD students during my research career</li><li>♦ <b>Organizer:</b> I have helped organize 10+ international conferences and workshops</li><li>♦ <b>Refereeing:</b> Journal of High Energy Physics (JHEP), Physical Review D (PRD), European Physical Journal C (EPJC), and Advances in High Energy Physics</li><li>♦ <b>Representative:</b> Postdoc representative and convener of <i>be-h project</i> (<a href="http://www.be-h.be">www.be-h.be</a>), Belgium</li></ul>
TEACHING	<ul style="list-style-type: none"><li>♦ Teaching Assistant at the University of Heidelberg 2024 <i>Standard Model of Particle Physics</i></li><li>♦ Teaching at Vrije Universiteit Brussel 2019 – 2020 <i>Statistical Physics</i></li><li>♦ Teaching Assistant at Quaid-i-Azam University 2009 – 2011 <i>Quantum Field Theory, Particle Physics and Group Theory</i></li></ul>

- 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.* **C78**, no.11 (2017) 905 [[arXiv:1710.01853](#)].
- [18] A. Ahmed and B. M. Dillon, “Clockwork Goldstone Bosons,” *Phys. Rev.* **D96** 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.* **D95** 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.* **C74** (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	◇ <i>Primordial Dirac Leptogenesis</i>	June 2025
	ITP, University of Heidelberg, Heidelberg	
	◇ <i>Conformal Dark Sectors</i>	May 2023
	Pushing the Limits of Theoretical Physics, MITP, Mainz	
	◇ <i>Dark Side of the Universe</i>	Mar 2023
	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>	Jan 2021
	Teilchen-Tee ITP Heidelberg and MPIK Theory Seminar	
	◇ <i>A Minimal Model for Neutral Naturalness and pNGB Dark Matter</i>	Apr 2020
	CERN Theory BSM forum (online)	
	◇ <i>Dilaton portal to composite twin Higgs</i>	Sep 2019
	SCALARS 2019, Warsaw, Poland	
	◇ <i>Neutral Naturalness at the LHC</i>	Jun 2019
	PLANCK 2019, Granada, Spain	
	◇ <i>A light scalar window at the LHC</i>	Jun 2019
	EoS be.h meeting, Brussels, Belgium	
	◇ <i>Neutral Naturalness at the LHC</i>	Dec 2018
	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  
CP<sup>3</sup> – 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, Foundation for Polish Science co-financed by the EU Regional Fund	2011 – 2015
	◆ 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	◇ <i>Programming:</i> Python, C/C++, Fortran, Wolfram Mathematica
	◇ <i>Data Science:</i> Numpy, Scipy, Scikit-learn, PyTorch, Scikit-HEP, MCMC
	◇ <i>Tools:</i> Git, Linux, LaTeX, Jupyter, Docker
	◇ <i>Soft Skills:</i> Project Management, Communication, Team Collaboration