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Deepak Sathyan

Curriculum Vitae

Education

2018–2024 **University of Maryland**, College Park, MD, USA.
Ph.D. in Physics
Thesis: Unifying Searches for New Physics with Precision Measurements of the W Boson Mass
Advisor: Kaustubh Agashe

2014–2018 **Boston University**, Boston, MA, USA.
Bachelor of Arts
Summa Cum Laude with honors in Physics
Major: Physics
Minor: Mathematics
GPA – 3.9
Senior Thesis: Muon (g-2): Searching for the Muon Electric Dipole Moment
Undergraduate Advisor: Robert Carey

Employment

2024–2027 **Postdoctoral Research Associate**, Mitchell Institute for Fundamental Physics and Astronomy, Texas A&M University, College Station, TX, USA 77843.

Research and Publications

Articles in Refereed Journals

1. **"LHC Signals for KK Graviton from an Extended Warped Extra Dimension"**
K. Agashe, M. Ekhterachian, D. Kim, DS
JHEP 11 (2020) 109 [arXiv:hep-ph/2008.06480]

2. **"Energy-peak based method to measure top quark mass via B-hadron decay lengths"**
K. Agashe, S. Airen, R. Franceschini, J. Incandela, D. Kim, DS
JHEP 06 (2023) 021 [arXiv:hep-ph/2212.03929v3]

3. **"A new purpose for the W-boson mass measurement: searching for New Physics in lepton+MET"**
K. Agashe, S. Airen, R. Franceschini, D. Kim, A. V. Kotwal, L. Ricci, DS
Phys. Lett. B 855 (2024) 138774 [arXiv:hep-ph/2310.13687]

4. **"Unification" of BSM Searches and SM Measurements: the case of lepton+MET and m_W**
K. Agashe, S. Airen, R. Franceschini, D. Kim, A. V. Kotwal, L. Ricci, DS
JHEP 02 (2025) 139 [arXiv:hep-ph/2404.17574]

5. **"New Laboratory Constraints on Neutrinophilic Mediators"**

P. S. B. Dev, D. Kim, DS, K. Sinha, Y. Zhang
Phys. Lett. B 868 (2025) 139765 [arXiv:hep-ph/2407.12738]

Articles in Review

1. **"New Constraints on Neutrino-Dark Matter Interactions: A Comprehensive Analysis"**
   P. S. B. Dev, D. Kim, DS, K. Sinha, Y. Zhang
   Submitting to *JHEP* [arXiv:hep-ph/2507.01000]
2. **"A Baryon and Lepton Number Violation Model Testable at the LHC"**
   A. Bhoonah, F. Burk, D. Liu, T. Ou, DS
   Submitting to *PLD* [arXiv:hep-ph/2508.21064]
3. **"Producing the GeV Galactic Center Excess via Cosmic Ray-Dark Matter Scattering"**
   B. Dutta, D. Goswami, J. Kumar, M. Rai, DS
   Submitting to *PRL* [arXiv:hep-ph/2605.08010]

Articles in Preparation

1. **"LHC as a Beam Dump Experiment"**
   B. Dutta, A. Karthikeyan, D. Kim, H. Kim, DS
   [arXiv:hep-ph/26xx.xxxx]
2. **"Astrophysical Neutrino Sources as Colliders"**
   B Dev, B. Dutta, G. Herrera, N. Kamp, A. Karthikeyan, J. Kumar, M. Rai, DS, I. Shoemaker, L. Strigari
   [arXiv:hep-ph/26xx.xxxx]
3. **"New Probes of Dark Sectors at a Muon Collider"**
   B. Dutta, A. Karthikeyan, K. Kelly, D. Kim, DS
   [arXiv:hep-ph/26xx.xxxx]
4. **"Searches for GeV-Scale KK Gravitons at Beam Dump Experiments"**
   D. Kim, DS, A. Verma
   [arXiv:hep-ph/26xx.xxxx]
5. **"LHC Signals for KK Gravitons Producing 8-Particle Final States"**
   K. Agashe, D. Kim, S. Mondal, K. Panchal, DS
   [arXiv:hep-ph/26xx.xxxx]
6. **"Exploring open systems approach to mixed neutrino or meson states"**
   A. Chandra Shekar, K. Kelly, DS, L. Strigari, T. Zhou
   [arXiv:hep-ph/26xx.xxxx]

Snowmass2021 Contributions

1. **"Snowmass2021 - White Paper, Implications of Energy Peak for Collider Phenomenology: Top Quark Mass Determination and Beyond"**
   K. Agashe, S. Airen, R. Franceschini, D. Kim, DS
   [arXiv:hep-ph/2204.02928]
2. **"Snowmass2021 White Paper: Collider Physics Opportunities of Extended Warped Extra-Dimensional Models"**
   K. Agashe, J. H. Collins, P. Du, M. Ekhterachian, S. Hong, D. Kim, R. K. Mishra,

DS
[arXiv:hep-ph/2203.13305]

Muon $g-2$ Articles

1. **"Measurement of the Positive Muon Anomalous Magnetic Moment to 0.46 ppm"**
Muon $g-2$ Collaboration · B. Abi et al.
Phys.Rev.Lett. 126 (2021) 14, 141801 [arXiv:hep-ex/2104.03281]
2. **"Beam dynamics corrections to the Run-1 measurement of the muon anomalous magnetic moment at Fermilab"**
Muon $g-2$ Collaboration · T. Albahri et al.
Phys.Rev.Accel.Beams 24 (2021) 4, 044002 [arXiv:physics.acc-ph/2104.03240]
3. **"The straw tracking detector for the Fermilab Muon g-2 Experiment"**
Muon $g-2$ Collaboration · B.T. King et al.
JINST 17 (2022) 02, P02035 [arXiv:physics.ins-det/2111.02076]

Seminars and Conferences Talks

Seminars

1. **A New Purpose for the W-mass Measurement: Searching for New Physics via $\ell + MET$**
Theory Seminar at Washington University in St. Louis, Oct 2023
HEP Seminar at Northwestern University, Oct 2023
HEP Seminar at University of Pittsburgh, Nov 2023
CMS SUSY general meeting, Nov 2023
Seminar at UT Austin, Dec 2023
Seminar at Texas A&M, Dec 2023
2. **Unification of Searches and Measurements: Probing BSM with the W boson mass measurement**
CMS Exotica general meeting, May 2024

Conference Talks

1. **A Baryon and Lepton Number Violaton Model Testable at the LHC**
Particle Physics on the Plains, November 2025
2. **Can the LHC be sensitive to light dark mediators?**
Phenomenology Conference, May 2025
CETUP* Workshop, June 2025
3. **A comprehensive analysis of supernova neutrino-dark matter interactions**
Mitchell Conference at Texas A&M University, May 2024
NuFact Conference, September 2024
Texas TACOS @ UT Austin, October 2024
Particle Physics on the Plains at University of Kansas, November 2024
4. **A New Purpose for the W-mass Measurement: Searching for New Physics via $\ell + MET$**
Particle Physics on the Plains at University of Kansas, October 2023

5. **Probing Dark Matter-Neutrino Interactions via Supernova Neutrinos**
   Phenomenology Conference, May 2023
6. **Model-Independent Measurement of Top Quark Mass Using B-Hadron Decay Lengths (Part I)**
   Phenomenology Conference, May 2022
7. **Signals of KK graviton from extended warped extra dimensions at the LHC (II)**
   Phenomenology Conference, May 2020
   April APS Meeting, April 2021

Miscellaneous Talks

1. My USD Talk

Teaching Experience

Fall 2018 Fall 2019	Fundamentals of Physics for Biologists
Spring 2019 Spring 2020	Fundamentals of Physics for Biologists II
Summer 2019 Spring 2022	Fundamentals of Physics I
Fall 2020	Introduction to Quantum Mechanics I
Fall 2021 Fall 2022	Mathematical Methods for Physics II
Spring 2024	Electricity and Magnetism I
Spring 2024	Principles of Modern Physics

Awards

2026 Breakthrough Prize in Fundamental Physics

Conferences Organized

May 2025	The Mitchell Conference on Collider, Dark Matter, and Neutrino Physics 2025
May 2026	The Mitchell Conference on Collider, Dark Matter, and Neutrino Physics 2026

Schools Attended

Jan 2023	GGI Lectures on the Theory of Fundamental Interactions
June 2024	TASI

Skills

- MadGraph5_aMC@NLO
- Mathematica
- Python
- Pythia6, Pythia8
- Delphes3
- C++

- GEANT4

Outreach

- BU Student Mentorship Program (2016 – 2018)
- TAMU Physics and Engineering Festival (2025 – 2027)