Rebecca K. Leane

Contact Information

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Research Interests

Dark Matter Phenomenology, Astroparticle Physics, Collider Physics, Physics beyond the Standard Model

Education

University of Melbourne 2013-Present
Centre of Excellence for Particle Physics at the Terascale (CoEPP)
Ph.D. in Physics (Expected July 2017)
Thesis Advisor: A/Prof. Nicole Bell

University of Cambridge 2012-2013
Department of Applied Mathematics and Theoretical Physics (DAMTP)
Master of Advanced Study in Mathematics (Part III of the Mathematical Tripos)
Essay Advisor: Prof. Ben Allanach

Monash University 2008-2011
Bachelor of Science Advanced with Honours
Majors: Physics and Mathematics. High Distinction.
Thesis Advisor: A/Prof. Csaba Balazs

Research Experience

Visiting Researcher Apr-Jun 2016
Center for Cosmology and AstroParticle Physics (CCAPP), Ohio State University, USA
Collaborating with Prof. John Beacom

Visiting Researcher Sep-Oct 2015
Vanderbilt University, USA
Collaborating with Prof. Tom Weiler

Graduate Student Researcher 2013-2017
CoEPP, University of Melbourne, Australia
Under supervision of A/Prof. Nicole Bell

Undergraduate Student Researcher 2010-2011
Monash University, Australia
Third year research project (2010), honours year research project (2011)
Under supervision of A/Prof. Csaba Balazs

Prizes, Awards & Scholarships

Royal Society of Victoria Young Scientist Research Prize	2016
Science Abroad Travelling Scholarship	2016
Best PhD Candidate Seminar of the Year in the School of Physics, U. Melbourne	2015
Laby Foundation Early Career Researcher Travel Scholarship	2015
Australian Postgraduate Award (APA)	2012-2016
Monash Jubilee Honours Scholarship	2011
J. L. William Honours Scholarship	2011

Publications

1. N. F. Bell, Y. Cai and **R. K. Leane***, "Impact of Mass Generation for Simplified Dark Matter Models", Submitted to JCAP [arXiv:1610.03063 [hep-ph]].

2. N. F. Bell, Y. Cai and **R. K. Leane***, "Dark Forces in the Sky: Signals from Z' and the Dark Higgs", JCAP 08 (2016) 001 [arXiv:1605.09382 [hep-ph]].

3. N. F. Bell, Y. Cai and **R. K. Leane***, "Mono-W Dark Matter Signals at the LHC: Simplified Model Analysis", JCAP 01 (2016) 051 [arXiv:1512.00476 [hep-ph]].

4. N. F. Bell, Y. Cai, J. B. Dent, **R. K. Leane*** and T. J. Weiler, "Dark matter at the LHC: Effective field theories and gauge invariance", Phys. Rev. D92, no. 5 053008 (2015) [arXiv:1503.07874 [hep-ph]].

5. N. F. Bell, Y. Cai, **R. K. Leane*** and A. D. Medina, "Leptophilic dark matter with Z' interactions", Phys. Rev. D 90, no. 3, 035027 (2014) [arXiv:1407.3001 [hep-ph]].

6. G. Brooijmans et al, "Les Houches 2011: Physics at TeV Colliders New Physics Working Group Report", FERMILAB-CONF-12-924-T (2012) [arXiv:1203.1488 [hep-ph]].
   (Note: Contribution 1, "DLHA: Dark Matter Les Houches Agreement", is heavily based on my bachelor thesis.)

Invited Seminars & Conference Talks

"Unitarity and Gauge Invariance in Dark Matter Models"
CETUP Dark Matter Workshop Talk, South Dakota, USA — Jul 2016
Particle Theory Seminar, University of Cincinnati, USA — May 2016

"Dark Forces in the Sky: Signals from Z' and the Dark Higgs"
Astroparticle Physics Seminar, CCAPP, Ohio State University, USA — Jun 2016
Particle Theory Seminar, UC Riverside, USA — May 2016
Particle Theory Seminar, UC Irvine, USA — May 2016
Pheno 2016 Symposium Parallel Talk, Pittsburgh, USA — May 2016
Particle Theory Seminar, University of Melbourne, Australia — Apr 2016

"Dark Matter at the LHC"
Particle Theory Seminar, SLAC National Accelerator Laboratory, USA — Oct 2015
Astroparticle Physics Seminar, CCAPP, Ohio State University, USA — Oct 2015
Astroparticle Physics Seminar, Fermilab, USA — Sep 2015
Astroparticle Physics Seminar, Vanderbilt University, USA — Sep 2015

"Dark Matter at the LHC: EFTs, Gauge Invariance and the Mono-W"
Particle Theory Seminar, University of Melbourne, Australia — Aug 2015

"Dark Matter at the LHC: EFTs and Gauge Invariance"
SUSY Conference Parallel Talk, Lake Tahoe, USA — Aug 2015
Geoff Opat Seminar Series, University of Melbourne, Australia — May 2015

"Leptophilic Dark Matter with Z' Interactions"
CosPA Conference Parallel Talk, New Zealand — Dec 2014
APCosPA Workshop Talk, University of Tokyo/RESCEU, Japan — Jul 2014

"Dark Matter and the Universe"
St Edmund's Academic Talks Series, University of Cambridge, UK — Jun 2013

Outreach

Key Scientific Researcher on International Science Documentary Series 2014-2015
"Uranium: Twisting the Dragon's Tail"
Worked with Emmy Award winning producer Sonya Pemberton and writer Wain Fimeri part time over 12 months. Had a major role in explaining science content and developing the script for the series. Aired in the United States, Australia, Germany, France, Middle East, Norway and Sweden. The series has been nominated for and won several science communication and film awards.

Young Scientist Research Prize Talk, Royal Society of Victoria, Australia 2016
Public Talk, Strathcona Girls' School, Australia 2014
Panel Member, National Science Week: Kids Ask Questions, Australia 2013
Panel Member, National Science Week: Ask a Scientist, Australia 2013
Public Talk, Monash University Open Day Seminar Series, Australia 2011
Physics Demonstrator, Monash University Open Day, Australia 2011

Teaching

ATLAS International Masterclass Tutor, Univ. of Melbourne 2015
Physics Teaching Assistant (Tutorials, Grading, Office Hours), Univ. of Melbourne 2014
Physics Teaching Assistant (Lab Demonstrator, Grading), Univ. of Melbourne 2012
Physics Teaching Assistant (Lab Demonstrator, Grading), Monash University 2011
High School Senior Tutoring, Physics and Mathematics 2008-2010

Technical Skills

Languages:
C++, Python, Bash, Mathematica.

Packages & Frameworks:
FeynRules, MadGraph, Pythia, ROOT, MadAnalysis, Fastjet, Delphes, micrOMEGAs, PPPC4DMID, FeynArts, FeynCalc, Ti*k*Z, matplotlib.

Other:
Linux OS, LaTeX.