

Grant RYC2024-048931-I funded by MICIU/AEI/10.13039/501100011033 and by ESF+



Axuda/Ayuda/ Grant CEX2023-001318-M
financiada por MICIU/AEI /10.13039/501100011033

By way of introduction

Gonzalo Alonso-Álvarez



INSTITUTO GALEGO
DE FÍSICA
DE ALTAS ENERXÍAS



Xacobeo 2027

Fondos Europeos

Cofinanciado pola
Unión Europea



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Trajectory

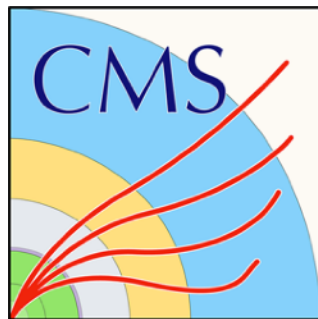
- 2026-present
JUNIOR, U. Santiago de Compostela (main) 
- 2023-2026
POSTDOC, U. Toronto  Physics
UNIVERSITY OF TORONTO
- 2021-2023
POSTDOC, McGill U., Montreal (main)  McGill
- 2016-2020
PHD, Heidelberg U.  UNIVERSITÄT
HEIDELBERG
ZUKUNFT
SEIT 1386
- 2015-201
MASTER, Cambridge  UNIVERSITY OF
CAMBRIDGE
- 2010-201
BACHELOR, Zaragoza U.  Universidad
Zaragoza
1542

Research coordinates

Particle and astroparticle physics phenomenology



theory



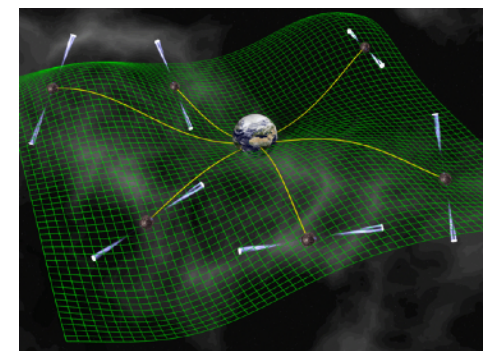
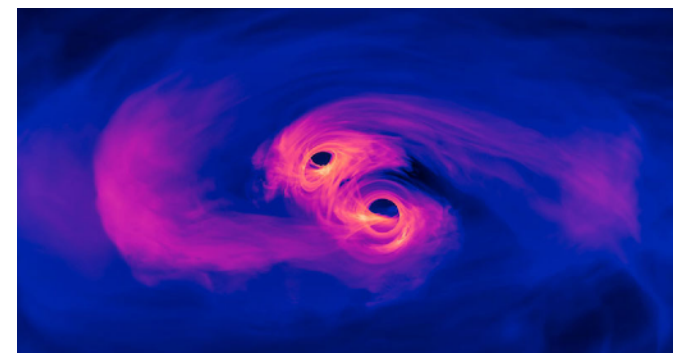
experiment

Institut Spatial de McGill

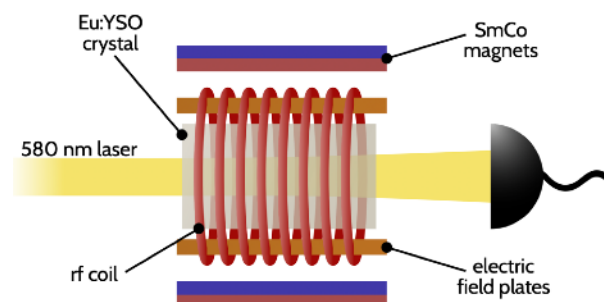


McGill Space Institute

astrophysics




CaDEX



Some recent papers

PHYSICAL REVIEW LETTERS 133, 021401 (2024)

Editors' Suggestion

Featured in Physics

Self-Interacting Dark Matter Solves the Final Parsec Problem of Supermassive Black Hole Mergers

Gonzalo Alonso-Álvarez^{1,2,*}, James M. Cline^{2,3,†} and Caitlyn Dewar^{2,‡}

¹Department of Physics, *University of Toronto*, Toronto, ON M5S 1A7, Canada

²Department of Physics & Trottier Space Institute, *McGill University*, 3600 Rue University, Montreal, QC H3A 2T8, Canada

³Theoretical Physics Department, *CERN*, Geneva, Switzerland



(Received 7 February 2024; revised 11 April 2024; accepted 2 May 2024)

Eur. Phys. J. C (2025) 85:635

<https://doi.org/10.1140/epjc/s10052-025-14336-1>

THE EUROPEAN
PHYSICAL JOURNAL C



Regular Article - Theoretical Physics

Dark photon distortions of NO ν A and T2K neutrino oscillations

Gonzalo Alonso-Álvarez^{1,a}, James M. Cline^{2,3,b}, Benoit Laurent^{2,c}, Ushak Rahaman^{1,4,d}

¹Department of Physics, *University of Toronto*, Toronto, ON M5S 1A7, Canada

²Department of Physics & Trottier Space Institute, 3600 Rue University, QC, Montréal H3A 2T8, Canada

³Theoretical Physics Department, *CERN*, Geneva, Switzerland

⁴Departament d'Enginyeria Nuclear (CSIC - Universitat de València), c/Catedrático José Beltrán, 2, 46980 Paterna, Valencia, Spain

Received: 21 May 2025

Physical Review Letters

Highlights Recent Accepted Collections Authors Referees Editorial Policies Press About Editorial Team

Wideband Search for Axionlike Dark Matter Using Octupolar Nuclei in a Crystal

Mingyu Fan¹, Bassam Nima², Aleksandar Radak³, Gonzalo Alonso-Álvarez^{1,*}, and Amar Vutukuru⁴

Hide

Department of Physics, *University of Toronto*, Toronto, Ontario M5S 1A7, Canada

*Present address: Instituto Galego de Física de Altas Enerxías, Universidade de Santiago de Compostela, 15782 Santiago de Compostela, Galicia, Spain.

PDF

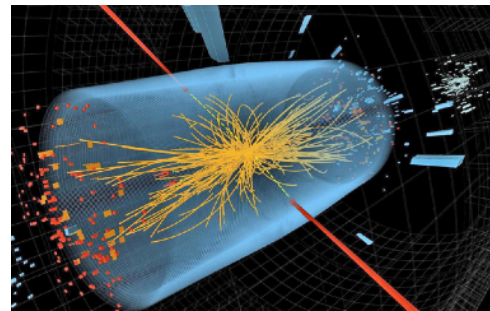
Dark astronomy with dark matter detectors

Gonzalo Alonso-Álvarez¹ and David Curtin²

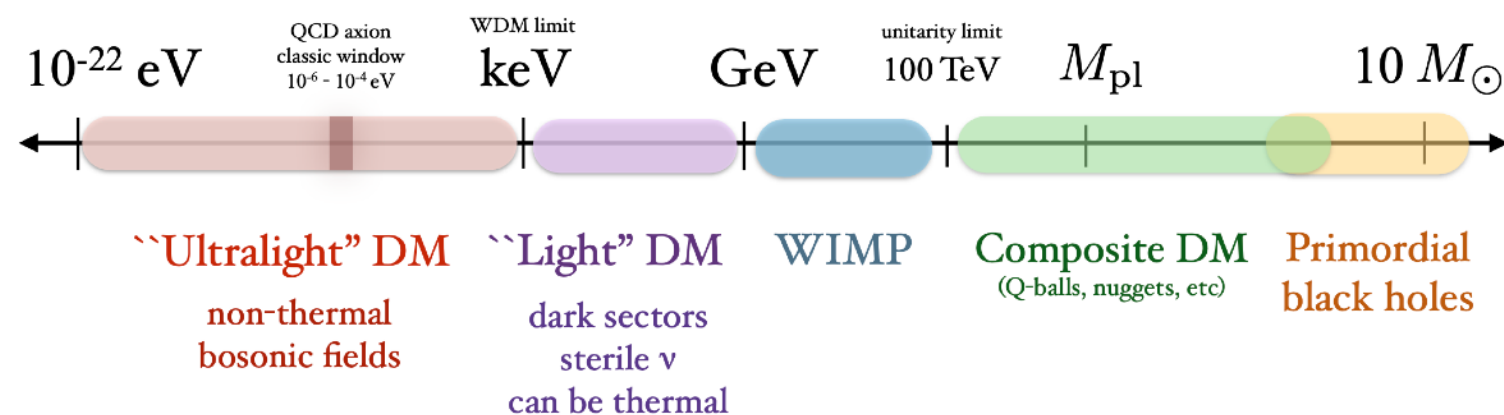
*Department of Physics, University of Toronto,
60 St George St, Toronto, ON M5S 1A7, Canada*

Future - Dark Matter

No signal at LHC or large-volume DM detectors

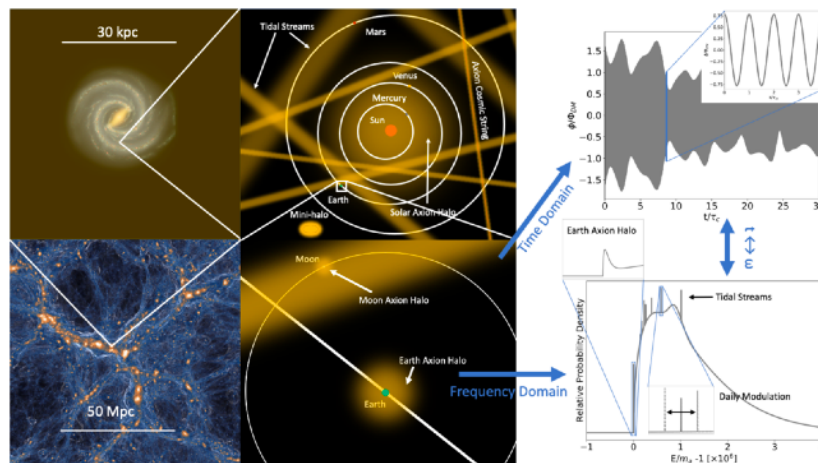


Look more broadly and embrace astrophysics

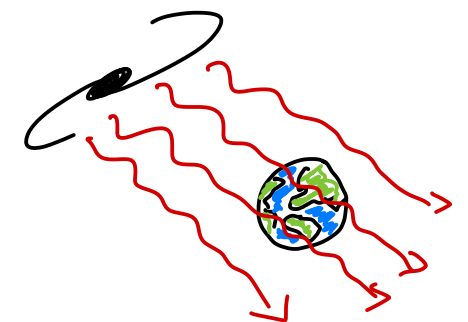


Axions

CaDEX

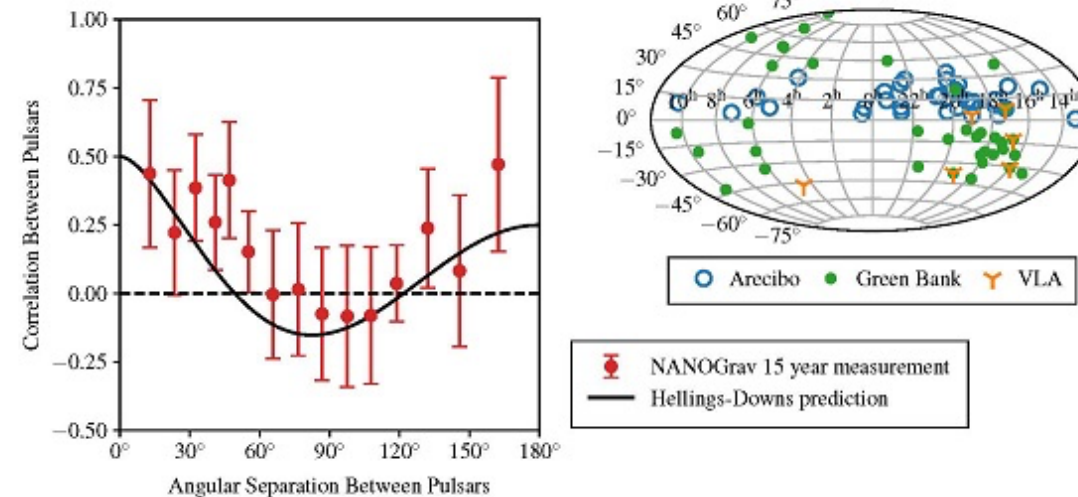
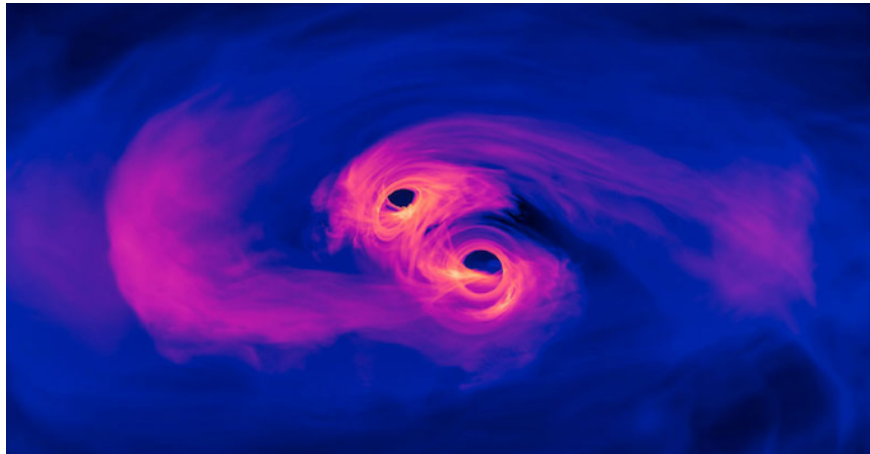


Dark radiation



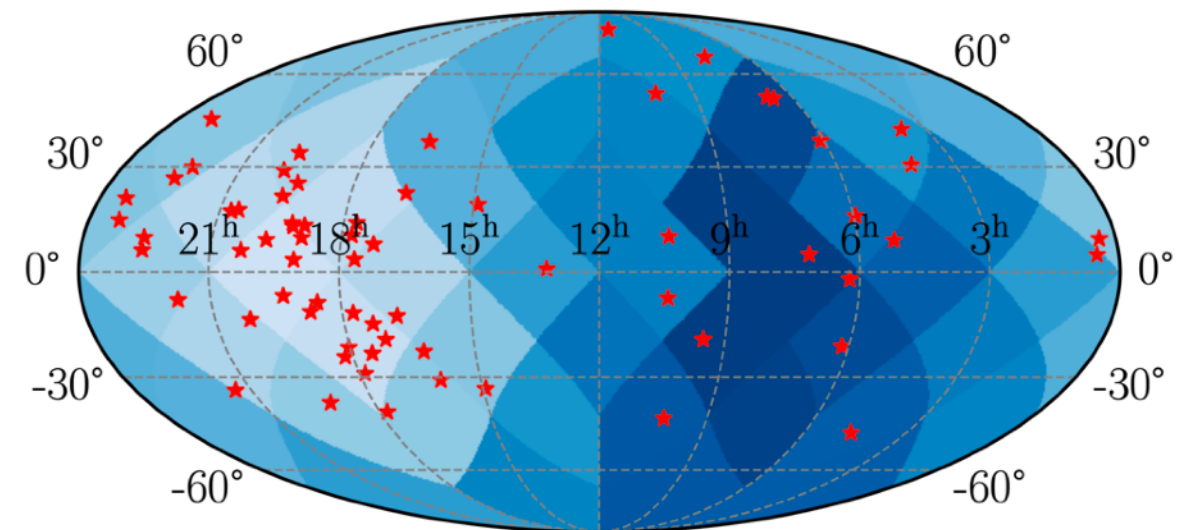
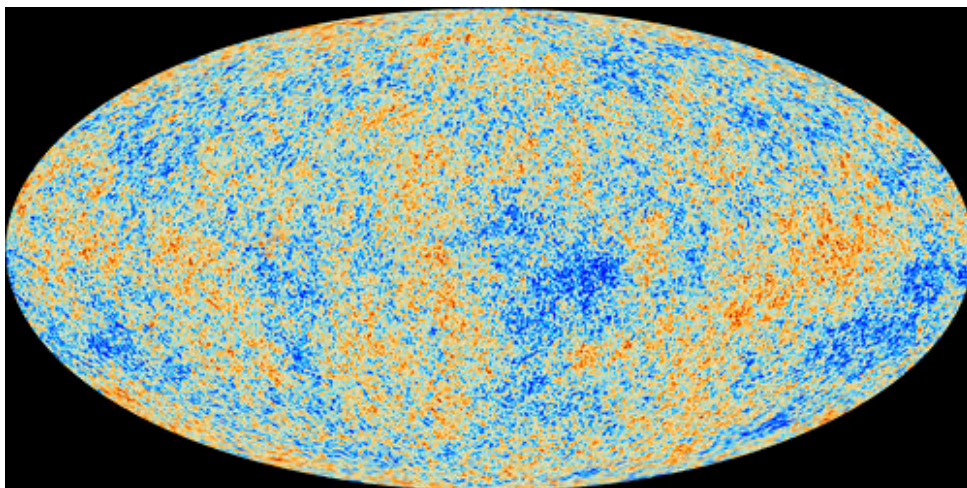
Future - Pulsar Timing Arrays

Effect of DM on nHz GW signal at PTAs



NANOGrav

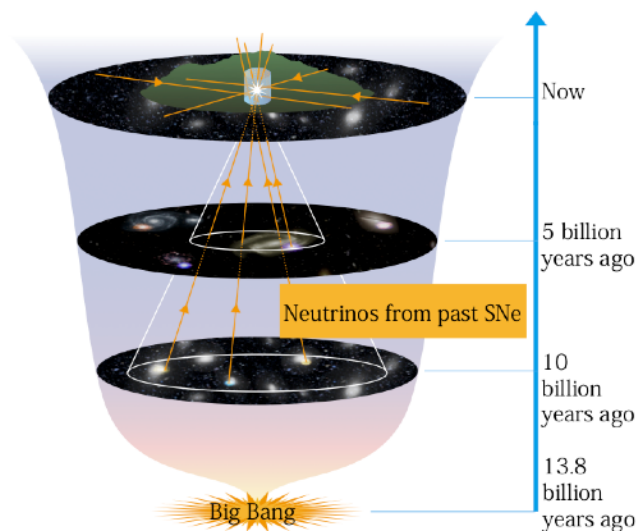
Analysis techniques to distinguish astrophysical and cosmological signals



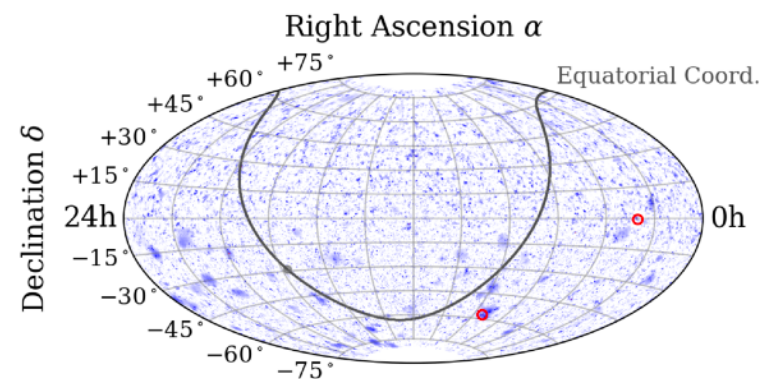
Future - Astrophysical Neutrinos

Astrophysics & cosmology: prime environments to test neutrino-dark matter connections

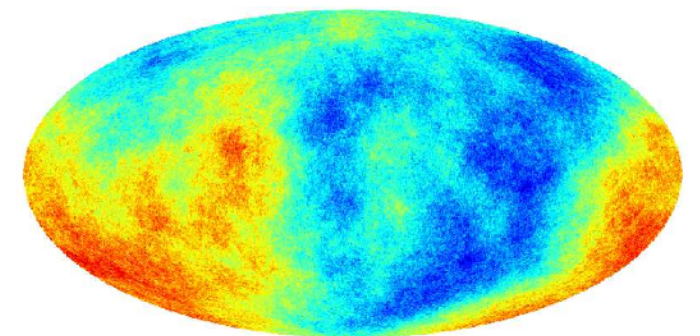
Supernova
neutrinos



High energy
neutrinos



Cosmic
neutrinos



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