

ECI committee report

**3rd General Meeting of COST Action COSMIC WISPers
(CA21106)**

Marta F. Zamoro

Who are we?


ECI = Early Career Investigators => “Young” members

- We are ~150 people
- Meeting once a month (not highest attendance ~10 people)
- We organize stuff

Monthly Colloquia

Title: "A New Source for (QCD) Axion Dark Matter Production: Curvature-Induced"

Speaker Géraldine Servant (DESY and Universität Hamburg, Germany)



Abstract I will discuss a novel mechanism for generating (QCD) axion dark matter that is particularly relevant at low axion decay constant where experiments are sensitive. Rather than coming from the energy initially stored in the zero-mode axion background field, the dark matter energy density comes from the fluctuations of the curvature perturbations. Such a source term is effective if the background scalar field has a large kinetic energy, as well-motivated in rotating axion models. These fluctuations can explain the totality of dark matter in a vast axion parameter space, particularly for the QCD axion, which will be targeted by upcoming experiments. I will review the conditions on this mechanism and the comparison with axion dark matter from the kinetic misalignment mechanism.

2 15.00 am (CEST)
APRIL 2025

ZOOM link: [Click here](#)

Title: "Shining axions through astrophysical walls"

Speaker BEN SAFDI (UC Berkeley, USA)




Abstract Axions are some of the best-motivated beyond the Standard Model particle candidates at present. These particles may account for the cosmological dark matter and explain other outstanding problems in nature, such as the strong-CP problem; they also are now known to emerge generically in string theory. Axions are expected to couple ultra-weakly with ordinary matter, and many of the most promising avenues for detecting axions rely on astrophysical observations of extreme systems that are able to magnify these feeble interactions. In this talk I will give an overview of the landscape of astrophysical axion detection efforts. I will discuss compact stars as axion laboratories, in particular highlighting recent work on magnetic white dwarf optical polarization signatures of axions and work identifying possible gamma-ray signals from future supernovae.

30 5.00 pm (CEST)
OCTOBER 2024

ZOOM link: [Click here](#)

Title: "Generalized Symmetries and Particle Physics"

Speaker Sungwoo Hong (KAIST, Taejeon)



Abstract Historically, symmetry has played an indispensable role in the progress of fundamental physics. In recent years, the notion of symmetry has undergone an almost explosive expansion, and we now refer to these as "Generalized Global Symmetries" or simply "Generalized Symmetries." In this talk, I will introduce the basic concepts and types of generalized symmetries. Then, I will discuss recent progress in which these new tools have helped us achieve a deeper understanding and create new solutions to important puzzles in particle physics.

13 10.00 am (CET)
DECEMBER 2024

ZOOM link: [Click here](#)

Mario Reig



Marta F. Zamoro



- Introduce Action to new potential members
- Give visibility to **researchers within network**

Objective for next year:

Gender balance → Try to reach 50-50 distribution

Fuensanta Vilches



New addition

Journal Club



Silvana Abi Mershed



Xavier Ponce Díaz




- Monthly meeting
- More focused on giving **visibility** to **younger** researches
- Possibility of presenting **recent paper** (arXiv) or **own work**

Newsletter

Newsletter

Newsletter July 2025

 lunes 28 jul 2025, 10:00 → 12:00 Europe/Rome

Descripción

This is July's edition of the newsletter of the COST action. The aim is to keep you updated on recent and upcoming conferences and postdoc positions on subjects related to WISPs.

Cosmic Wispers preprints

Deep Neural Networks Hunting Ultra-Light Dark Matter

[Pavel Kús](#), [Diana López Nacir](#), [Federico R. Urban](#)

<https://arxiv.org/abs/2506.04100>

ULDM induces measurable, characteristic signals in pulsar-timing data because it causes the orbits of pulsars in binary systems to osculate. We investigate the potential of machine learning techniques to detect such ULDM signals with three types of neural networks: an autoencoder, a binary classifier, and a multiclass classifier. We apply these methods to scalar, vector and tensor ULDM and find that the sensitivity achieved using machine learning methods is comparable to that of a semi-analytical Bayesian approach.

Resolving the QCD Axion Domain Wall Problem by a Light Axion

[Junseok Lee](#), [Kai Murai](#), [Fuminobu Takahashi](#), [Wen Yin](#)

<https://arxiv.org/abs/2507.07075>

We show that the QCD axion domain wall problem can be resolved by introducing an additional massless or light axion that also couples to gluons. The underlying mechanism is straightforward: the domain walls associated with the QCD axion can terminate on strings of this auxiliary axion, causing the network to collapse into string bundles that behave as ordinary cosmic strings. This scenario predicts the formation of stable string bundles, which can leave observable signatures such as gravitational waves, cosmic birefringence, and anisotropies in the cosmic microwave background. The simultaneous detection of QCD axion dark matter and any of these signals would provide a smoking-gun signature of this mechanism.

We encourage participants in the COST action to send us a small summary, typically smaller than the abstract, of their own articles that will appear in the arXiv (after they appear, with their arXiv numbers). The summary will be disseminated in the newsletter.

Send email to

Alessandro Lella alessandro.lella@ba.infn.it

Damiano Fiorillo damianofg@gmail.com

with subject: preprint summary for Cosmic WISPs newsletter.

- COSMIC WISPs **preprints**
- **Conferences** and **workshops**
- PhD and Post-doc **positions**
- . . .

Write to them with news!

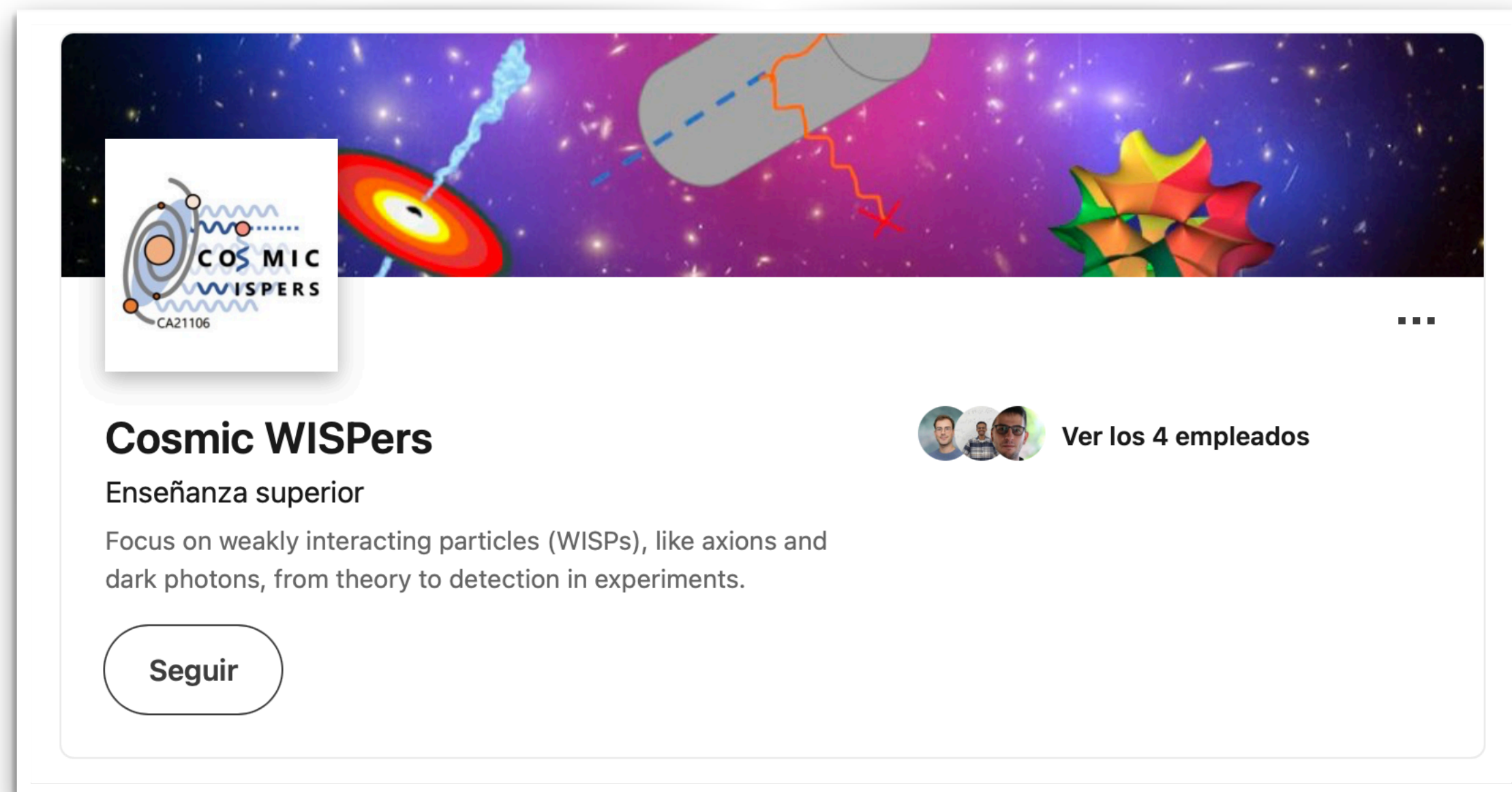
Damiano Fiorillo



Alessandro Lella



Social Media




- High impact on **LinkedIn**
- Out of X

Silvana Abi Mershed







Social Media





Cosmic WISPer
83 seguidores
23 h


A glimpse of our 3rd General Meeting for Cost Action Cosmic WISPer (CA21106) in Bulgaria!
There's nothing quite like bringing together experts from particle physics, astrophysics, and cosmology to tackle one of the biggest mysteries in science: the nature of dark matter. Our focus is on Axions and WISPs—elusive particles that could be hiding in plain sight, beyond the Standard Model.
This meeting was all about synergy: reviewing our working groups' status, sharing groundbreaking ideas, and setting the course for future investigations. The energy and collaboration were truly inspiring. Huge thank you to everyone involved for the stimulating discussions and warm hospitality. Onwards and upwards in the hunt for WISPs!



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 Recomendar

 Comentar

 Compartir

Silvana Abi Mershed

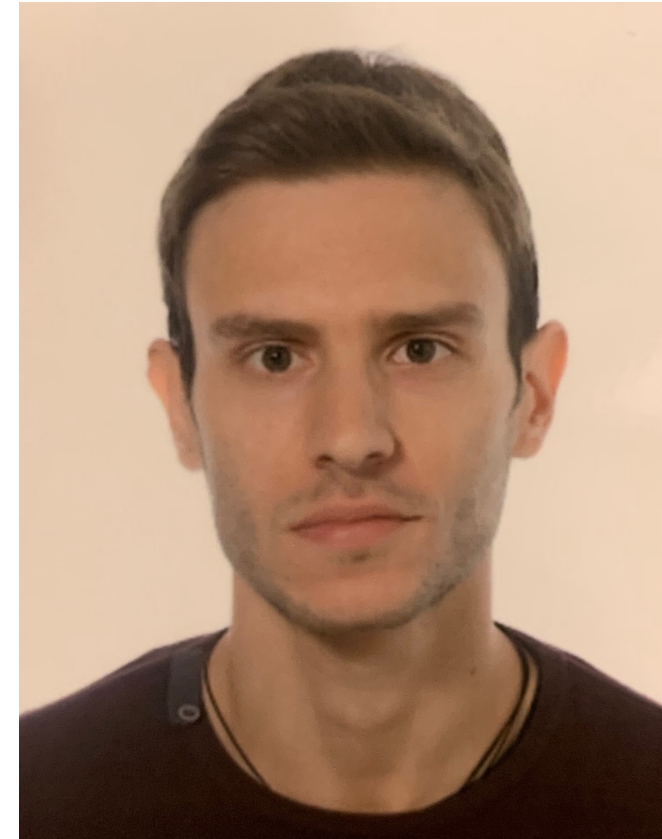


Tutorials

So far:

- The QCD axion potential
- Axions from string theory
- Plasma haloscopes
- Topological defects

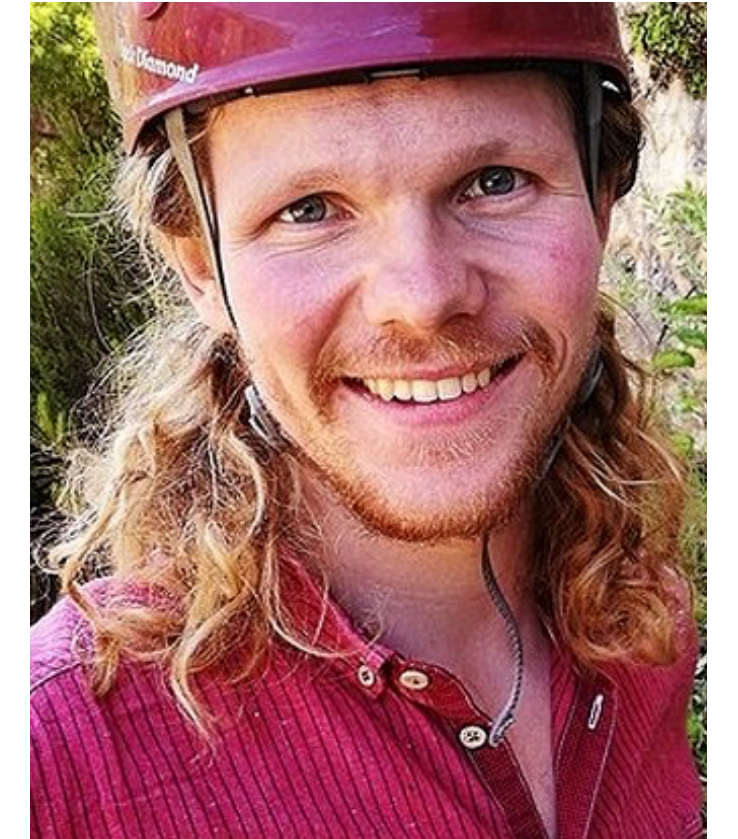
**Luca
Caloni**



**Amadeo
Favitta**



**Philip
Sørensen**



- ECIs and seniors members share expertise on specific topics
- Basic but practical examples
- Open to everyone, especially ECIs

Interested in learning more about a topic? Are you and expert on something and want to teach? Write to them!

Proceedings

Proceedings of 2nd Training School and General Meeting **done**

Board of **editors** for **3rd** already **chosen** → 2 per WG

2025

Giuseppe Lucente
Arturo de Giorgi
Gerben Venken
Amelia Drew
Giovanni Pierobon
Damiano Fiorillo
Cristian Cogollos
Marios Maroudas

2026

Gabriele Levati
Xavier Ponce Díaz
Marta F. Zamoro
Alessandro Lenoci
Tanmay Poddar
Gaetano di Marco
Shyam Balaji
Sas Nandor
Ivana Batkovic

Proposal

- Reaching the end of the Action → Plenty of STSM carried out → New and interesting knowledge

Give ECIs opportunity to present work (~10 min), both projects from STSM or related to Action

Benefits

- Promote Have opportunity to talk (~10 min, as in school), but with senior researches in the audience
- Soft skills improvements

Open for ideas!

Highest chance at organizing **success** → **Extra day** in General Meetings or in WG meetings

Thank you for your attention

