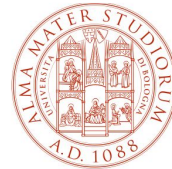
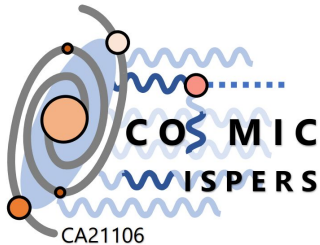

report from WG1

WISPs Model Building

Ilaria Brivio, Michele Cicoli

University & INFN Bologna



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



WG1 targets in a nutshell

Tasks

- coordinate **theory advancements** and promote **knowledge exchange** among groups
- bring together diverse communities in a synergic way, to address open issues with different approaches
- give **theoretical guidance** to experimental searches

Top-down

start from **concrete BSM scenarios**
[string theory, axion models...]



determine UV-motivated WISP properties
how many and which WISPs are produced?
when is a QCD axion produced?
what are natural values for masses and couplings?

Bottom-up

identify UV scenarios
compatible with observation



start from phenomenological study
in **Effective Field Theory**

Organization & Internal communication

WG Leader: Michele Cicoli michele.cicoli@unibo.it

WG Co-Leader: Iliaria Brivio ilaria.brivio@unibo.it [stepping down]

★ **New incoming Co-Leader:** Sophie Renner sophie.renner@glasgow.ac.uk

Google Group “CosmicWISPers WG1”

<https://groups.google.com/g/cosmicwispers-wg1/>

- 78 registered members so far
- mailing list: cosmicwispers-wg1@googlegroups.com
- address book visible to all members



WG1 Monthly meetings

<https://agenda.infn.it/category/1832/>

- virtual format (zoom)
- Mondays 2pm. so far: 4 meetings since March. resuming again in October.
- about 1h30 long:
 - 3 x 20' **talks** by WG1 members, to present research interests and activities
 - 30' **discussion**

Goal for the first year:

get to know each other & stimulate physics discussions



WG1 contributions to Action events

Kickoff Meeting , Feb 2023

Out of the dark: WISPs in String Theory and the Early Universe	Prof. Joe Conlon	09:30 - 10:10
Uncovering axion and BSM CP violations with EDMs	Prof. Kiwoon Choi	10:10 - 10:50
Prospects to scrutinise or smash SM*A*S'H	Andreas Ringwald	11:20 - 12:00
Flavour in ALP effective field theories	Sophie Renner	12:00 - 12:40

09:00	Theory overview: the QCD axion	Luca Di Luzio	09:00 - 09:30
	Aula Touschek, Laboratori Nazionali di Frascati (Rome), Italy		
	Theory overview: ALPs from string theory	Alexander Westphal	09:40 - 10:10
10:00	Aula Touschek, Laboratori Nazionali di Frascati (Rome), Italy		
	Theory overview: dark photons and other non-ALP WISPs	Mark Goodsell	10:20 - 10:50
	Aula Touschek, Laboratori Nazionali di Frascati (Rome), Italy		

1st General Meeting , Sept 2023

plenary session yesterday morning
+ parallels on Tue & Thu

1st Training School , Sept 2023

“Axion theory and production in the early universe”

Lecturer: Kiwoon Choi (IBS, Daejeon). Trainer: Nicole Righi (King's College, London)

Other WG1 Activities so far

- Dissemination talk
Ultra-light axions in string cosmology
Michele Cicoli, String Phenomenology 2023, 3-7 July 2023, IBS, Daejeon
- Outreach talk
String theory multiverse
Michele Cicoli, European researchers' night 2023, 27 Sep 2023, Bologna
- STSM: Matteo Licheri Bologna → Cambridge

Plans for future activities

year 2

- continue monthly meetings series
- contributions to 2nd GM and training school
- STSM, dissemination and outreach talks

year 3 - 4

- upgrade monthly meetings format.
eg: invite external speakers, organize by topics, target specific recent papers...
- organize topical workshops. one potentially hosted in Bologna


Topical Meetings

plan to organize **in-person / hybrid Topical Meetings** starting from GP3

possible topics:

- the **QCD axion window** in the axion/ALP parameter space
- the **DM window** in the ALP parameter space
- properties of **ALPs from string** compactifications
- Hidden photons
- ...

Deliverables and further plans

 preparation of a WG1 **report**.
possible content:

- **catalogue** of WISPs and their properties from TH and pheno points of view
- dictionary between them
- overview of **BSM scenarios** WISPs emerge from
- ...

 increase cooperation with **other WGs**

 more scientific **publications** and **talks** at international conferences