

<p>Action Number: CA21106</p>
<p>Room Title: WG1-WISPs Model Building</p>
<p>Rapporteur(s): Ilaria Brivio</p>
<p>Meeting Participants interested in contributing to the topic: <i>(Only for the groups discussing Grant Awarding, Science Communication plan and Stakeholder Engagement – WGs information on the e-COST platform.)</i></p>
<p><b>What is our main goal?</b></p> <p>The overall goal is to give theoretical guidance to experimental searches for WISPs, in particular the QCD axion and axion-like particles. WG1 should make progress in identifying the theoretically and phenomenologically preferred window in parameter space where realistic axion models live in well-motivated extensions of the Standard Model. A particularly important task in this direction is to determine the nature, number, masses and couplings of WISPs that arise in well-motivated theories of fundamental physics.</p> <p>Another important goal is creating a strong European network of researchers working on WISPs from different points of view ranging from string theory to effective field theory, phenomenology and cosmology. Bringing together experts in WISPs physics who work on related topics from different and complementary perspectives will definitely help to make progress.</p>
<p><b>How can we achieve it?</b></p> <p>The main goal of WG1 will be achieved via a complementary study based on both a top-down and a bottom-up approach. From a top-down perspective, we will try to understand which type of WISP candidates arise naturally in string compactifications with moduli stabilisation and a semi-realistic chiral visible sector. In doing so, we will pay particular attention to the interplay between the theoretical predictions for different observables, like inflation, dark matter and the scale of supersymmetry breaking. From a bottom-up perspective, we will identify specific WISP models which are particularly promising due to their impact on cosmological and astrophysical observables. We will also investigate the sensitivity of current and planned experiments to these models.</p> <p>The requirement of a consistent embedding in a UV complete theory should constrain the model building possibilities, whereas the identification of promising phenomenological features should help to single out which corner of the string landscape could describe our Universe.</p>

### **Which resources do we need?** (e.g. budget, use of networking tools, different expertise etc.)

We would like to have two classes of activities:

- a) oriented towards more “technical” theory advancement
  - b) oriented towards coordination of theory models/targets for experiments.
- For these activities it will be nice to have representatives of other WGs participate (“contact” roles)

Specifically, we plan to use the following COST instruments:

- online seminars to share individual knowledge, expertise and interests
- topical meetings, with the participation of people with complementary expertises to discuss a common topic. Non-exhaustive examples are “axions from string theory”, “axions in cosmology”, “axions as DM candidates”, “non-axion WISPs”....
- STSM to develop new collaborations that will hopefully arise from our exchanges
- broader workshops and training schools

A point was made that we should make sure that our meetings are appealing also to people who are currently outside the Action, in order to attract possible stakeholders and make sure they will participate in the activities.

### **What are the next steps?**

- organization of kick-off meeting(s), where Action participants present briefly their expertise and interests, in order to get to know each other
- definition of an agenda for regular seminars/meetings, e.g. (bi)-monthly virtual meetings with 3-4 presentations on recent results.
- collect proposals for topical meetings, such as workshops and PhD schools, to be organised in the next year or two
- definition of other potential activities, e.g. discussion forums, coordinated scientific projects...