Credit: ESO (eso0708a)

WG2 Discussion

Working Group Meeting of COST Action COSMIC WISPers (CA21106),
DESY, Hamburg, Germany
February 2, 2024

Edoardo Vitagliano
edoardo.vitagliano@unipd.it
University of Padua

EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

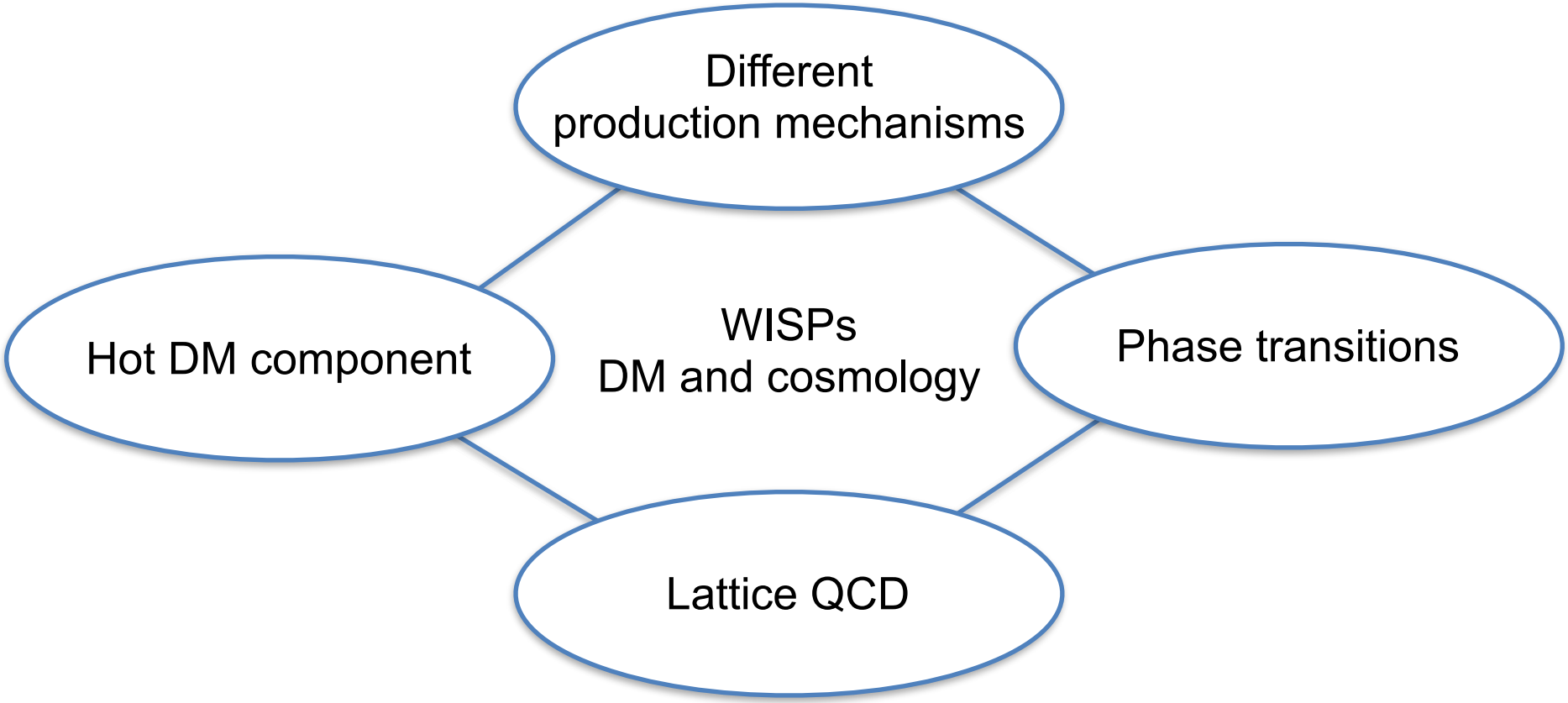
CA21106

Working group 2 in a glance

Many questions:

- WISPs are a great DM candidate—how many ways to produce them?
- Different non-thermal processes, misalignment mechanism, phase transitions, topological defects networks
- If QCD axion is *the* DM, can we reliably predict its mass and couplings?
- What is the abundance of miniclusters? Huge consequences for WG3 and WG4

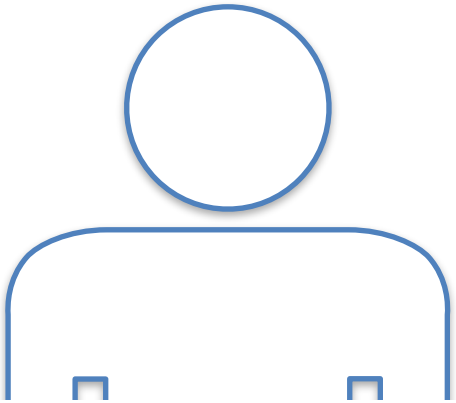
Working group 2 in a glance



A large community with many different expertises

- Around 150 people in the WG
- Great overlap with all the other WGs
- Several activities organized together with WG3

Coordinators



Edoardo Vitagliano

Javier Redondo

Important to get results

- Great experimental efforts to detect the QCD axion—extremely valuable to identify an expected mass range
- Very important consequences for large density variations
- Astrophysical signals might be very important to discover the nature of dark matter

Ongoing activities

Together with WG3, we have organized a timely online mini workshop on NANOGrav results

Wednesday, 5th of July

- 3pm Prof. Alberto Sesana, **Nano-Hz gravitational waves: first evidence and implications**

From 4pm on the same day

- Fabrizio Rompineve (CERN), **Footprints of the QCD Crossover on Cosmological Gravitational Waves at Pulsar Timing Arrays**
- Yann Gouttenoire (Tel Aviv University), **TBC**
- Marek Lewicki (University of Warsaw), **Cosmic Superstrings Revisited in Light of NANOGrav 15-Year Data**
- Antonio Iovino (La Sapienza University of Rome), **The recent gravitational wave observation by pulsar timing arrays and primordial black holes: the importance of non-gaussianities**
- Anish Goshal (University of Warsaw), **Probing the Dark Matter density with gravitational waves from super-massive binary black holes**

Planning ahead

- Possible workshops and schools dedicated to prediction of the DM abundances
- Possibility of funding visiting periods
- We plan to ask all the people in the working group to fill up a form with name, institution, reasons why they join the working group, and how they could contribute to the success in reaching the goals of the WG
- Continued collaboration with WG3 (planning a mini-workshop similar to the one dedicated to NANOGrav)
- Subtask 2.1.4 an important goal to be reached with the collaboration of the members
- Other subtasks could be realized as the result of collaborations inspired by the WG

This workshop

WG1: Which particle models are interesting?

WG2: Computing the abundance, large overlaps with numerical simulation communities

WG3: Effects on astrophysical bounds!

WG4: Effects on laboratory searches!

WG5: Nice plots and visualizations, good help for outreach