InDARK

Consiglio di Sezione INFN Milano

Members

- Emanuele Castorina (responsabile)
- Maria Archidiacono
- Matilde Barberi Squarotti

Collaborations

Internal

- INFN Firenze (Diego Redigolo, Marko Simonovic)
- INFN Genova (Enzo Branchini, Marco Raveri)
- INFN Padova (Massimo Pietroni)
- INFN Parma (Guido D'Amico)
- INFN Torino (Stefano Camera, Stefano Gariazzo)
- INFN Trieste (Emiliano Sefusatti, Matteo Viel)

External

- Julien Lesgourgues (RWTH Aachen)
- Ennio Salvioni (University of Sussex)
- Berkeley Cosmology Group

Conference organization

New Physics from Galaxy Clustering III

4–8 Nov 2024
Centro Congressi S. Elisabetta, Parma
Europe/Rome timezone

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- Overview
- Registration Form
- Participant List
- Travel Information
- Accommodation

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Recent progress in theoretical modeling of galaxy clustering has led to new types of data analyses, which are particularly important for constraining extensions of the LCDM cosmological model. However, the landscape of the possible signatures that can be tested using Large Scale Structure observations, including the ongoing DESI and Euclid surveys, remains largely unexplored.

Building on the success of the previous installments

- II at IFPU Trieste in 2023: https://indico.cern.ch/event/1308028/,
- I at CERN in 2022: https://indico.cern.ch/event/1192722/,

the goal of this workshop is to bring together the cosmology and particle theory communities, to discuss current and future opportunities to probe fundamental physics using galaxy clustering.

The workshop will be held at the University of Parma. The program will be designed to facilitate interaction, with a limited number of talks accompanied by discussion sessions and ample free time for exchange.

The meeting will start on Monday, November 4, 2024, and end on Friday, November 8.
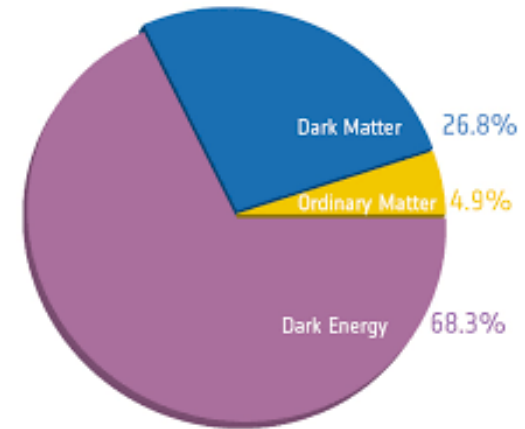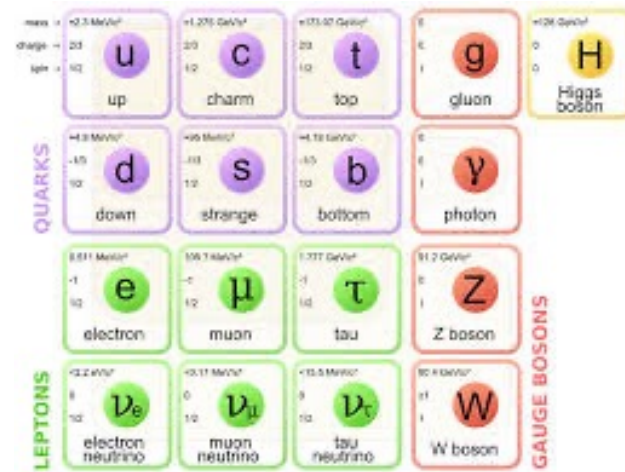
Organizers:

- Emanuele Castorina (University of Milan)
- Guido D'Amico (University of Parma)
- Azadeh Moradinezhad Dizgah (CNRS - LAPTh Annecy)
- Massimo Pietroni (University of Parma)
- Diego Redigolo (INFN Florence)
- Ennio Salvioni (University of Sussex)
- Marko Simonović (University of Florence)
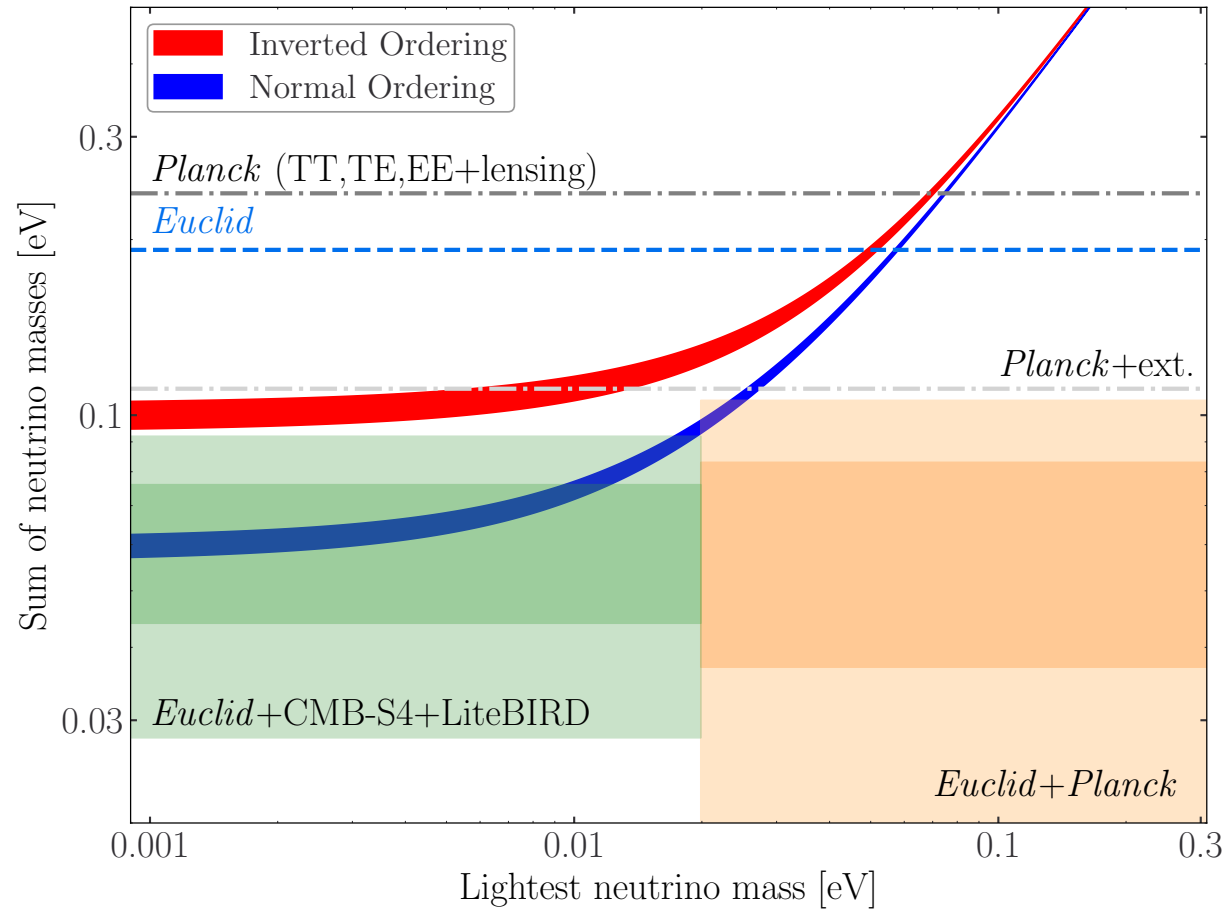
Research lines

- Particle cosmology

Credits: ESA Euclid Consortium

Neutrino physics

- Euclid in combination with upcoming CMB surveys can achieve a 4σ detection of Σm_ν, even if Σm_ν = 0.058 eV

- Cosmology is not directly sensitive to the neutrino mass ordering, like JUNO, however, if Σm_ν = 0.058 eV, then Euclid in combination with future CMB surveys can exclude IH at about 2σ

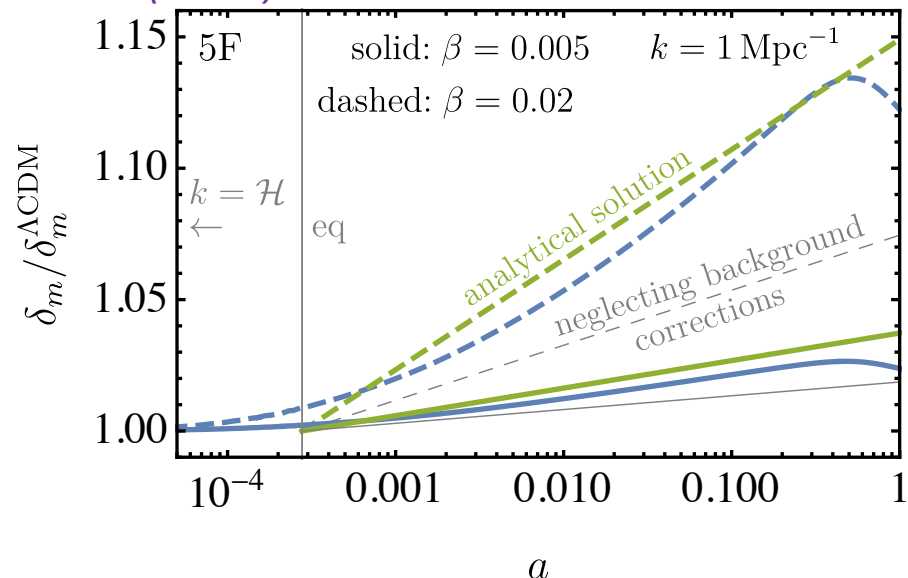# Sensitivity to non-standard particle dark matter models

Euclid Collaboration: Lesgourgues et al., arXiv:2406.18274

- Warm dark matter
- Decaying dark matter
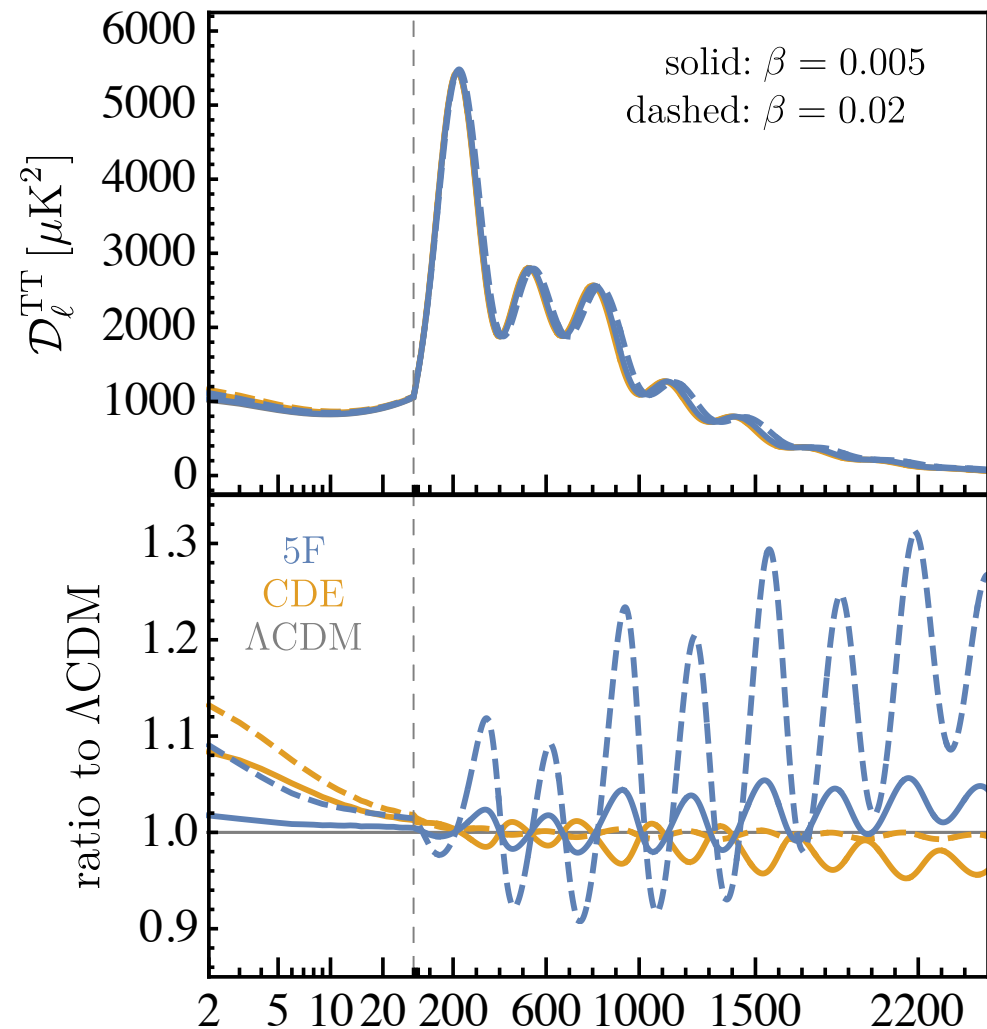- Dark matter interacting with dark radiation
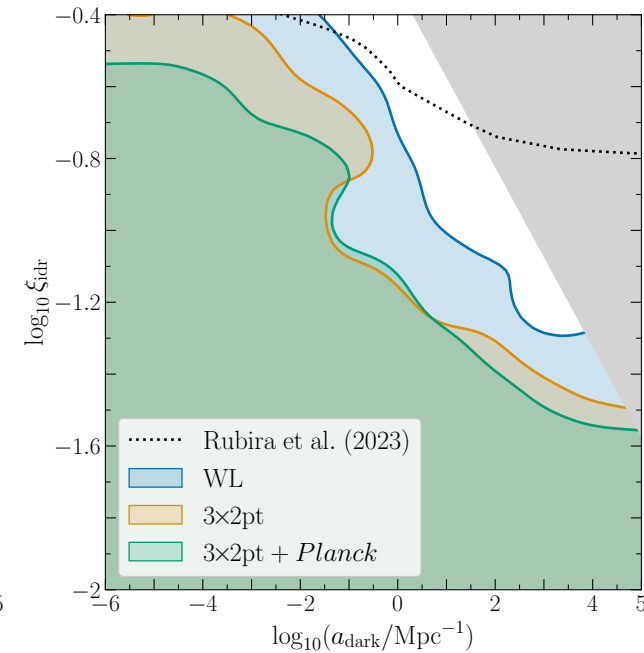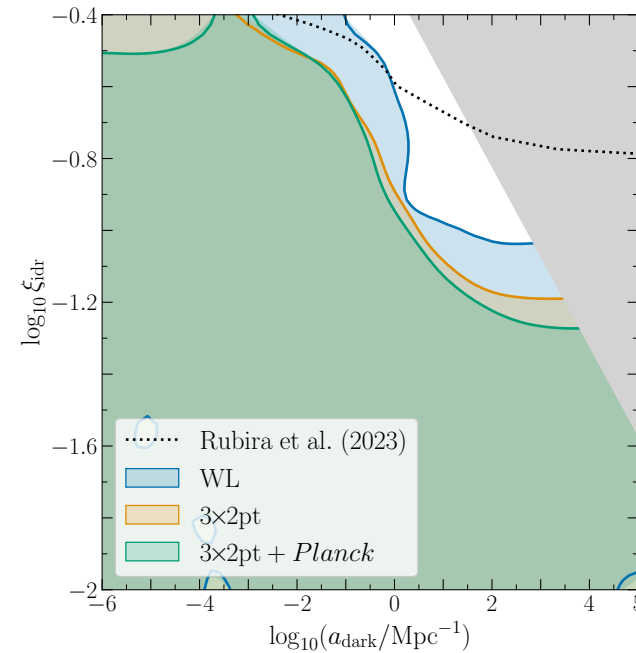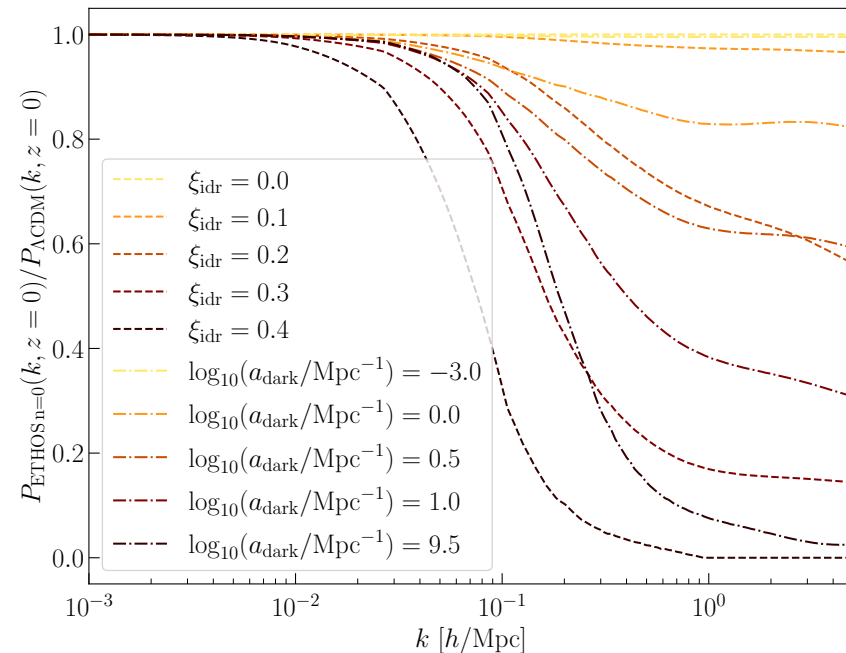
Dark forces

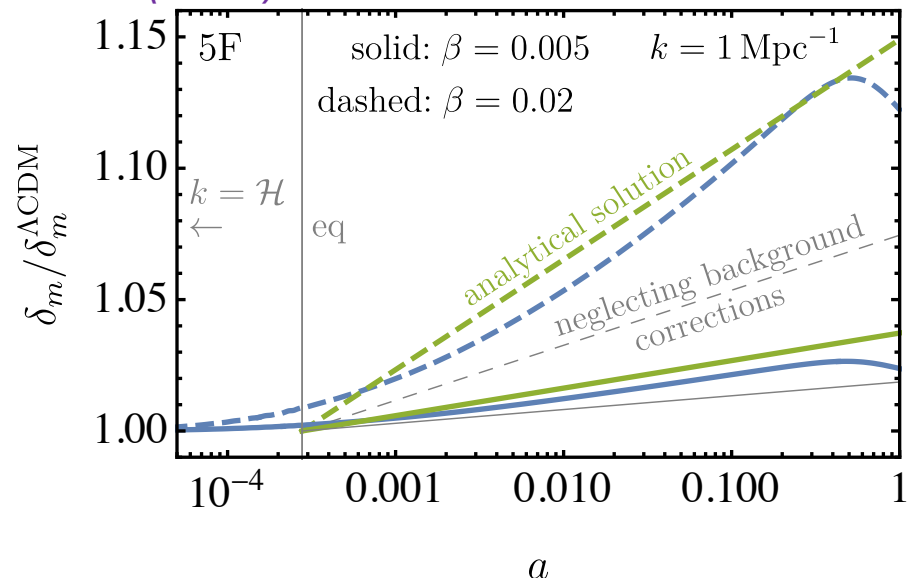*Archidiacono, Castorina, Redigolo, Salvioni, JCAP (2022)*

Dark matter with self-interactions generated by a new long range dark force mediated by a scalar field.
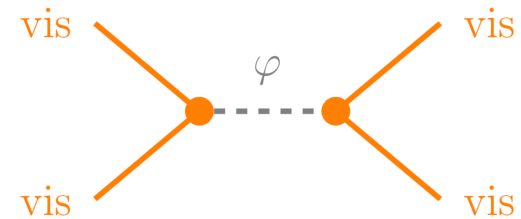
Dark forces

Archidiacono, Castorina, Redigolo, Salvioni, JCAP (2022)

Dark matter with self-interactions generated by a new long range dark force mediated by a scalar field.
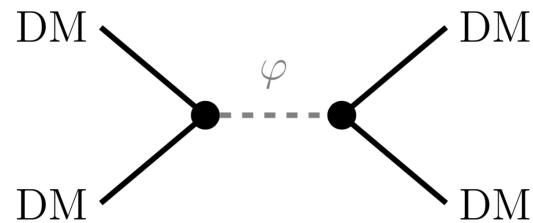
EFT of LSS in the presence of dark forces allows to improve the constraints

Bottaro, Castorina, Costa, Redigolo, Salvioni, PRL (2024)