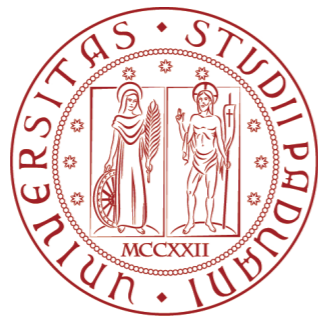


# TAsP

## *Preventivi 2019*

**Francesco D'Eramo**



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA



CdS INFN Padova  
10 July 2018

# TAsP

## Theoretical Astroparticle Physics Research Network

**12 Nodes**

**National PI: Eligio Lisi (Bari)**

- *Neutrino Physics*
- *Dark Matter*
- *Astrophysical Sources of Radiation*
- *Cosmology*
- *Interplay with Particle Physics*



# TAsP in Padova

Name	Position	% in TAsP
Laveder Marco	Ricercatore	20
Masiero Antonio (PI)	Prof. Ordinario	80
Paradisi Paride	Prof. Associato	20

**TAsP in 2017: 1.2 FTE**

# TAsP in Padova

Name	Position	% in TAsP
D'Eramo Francesco (PI)	Ricercatore tipo B	80
Laveder Marco	Ricercatore	20
Masiero Antonio	Prof. Ordinario	80
Paradisi Paride	Prof. Associato	20
Peloso Marco	Prof. Associato	70
Schmitz Kai	Postdoc	100

**TAsP today: 3.7 FTE**

**Richieste Missioni: 7.5 kEURO**

# Research Directions

## Relics from the Big Bang

### ***WIMPs***

- Direct, indirect and collider searches in WIMP models
- Application of Effective Field Theory techniques for accurate experimental rate predictions

### ***Axions***

- Axion cosmology for supersymmetric theories and/or modified expansion histories
- Hot axions as dark radiation

### ***Light (keV to GeV) Dark Matter Mass Window***

- Innovative and testable dark matter genesis
- Theoretical frameworks for sub-GeV indirect detection
- Novel mechanisms to produce X-ray lines with unique morphology and spectrum
- Cosmological bounds on sub-MeV dark matter

# Research Directions

## Early Universe

### ***Inflation***

- Simultaneous dynamical generation of inflation and supersymmetry breaking scales
- Particle production during inflation and imprint into the spectrum of primordial gravitational waves

### ***Matter/Antimatter Asymmetry***

- Leptogenesis in radiative neutrino mass models and observable consequences
- Leptogenesis in natural inflation
- Baryogenesis in axion-driven inflation

### ***Large Scale Structure***

- Galilean invariant resummation of cosmological perturbations
- Extractor of baryon acoustic oscillations

# Research Directions

## Weakly-Coupled Light Particles

### ***Light Pseudo-Scalars***

- Lepton dipole moments
- New physics explanations for the anomalous measurement of the muon  $g-2$
- Correlated experimental signals

### ***Sterile Neutrinos***

- eV scale sterile neutrino addressing experimental anomalies at reactors
- Cosmological bounds on neutrino statistics

# TAsP - Summary

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**3.7 FTE**

**7.5 kEURO**

***Inflation***

***Light (keV to GeV) Dark  
Matter Mass Window***

***WIMPs  
Axions***

***Matter/Antimatter Asymmetry***

***Light Pseudo-Scalars***

***Sterile Neutrinos***

***Large Scale Structure***