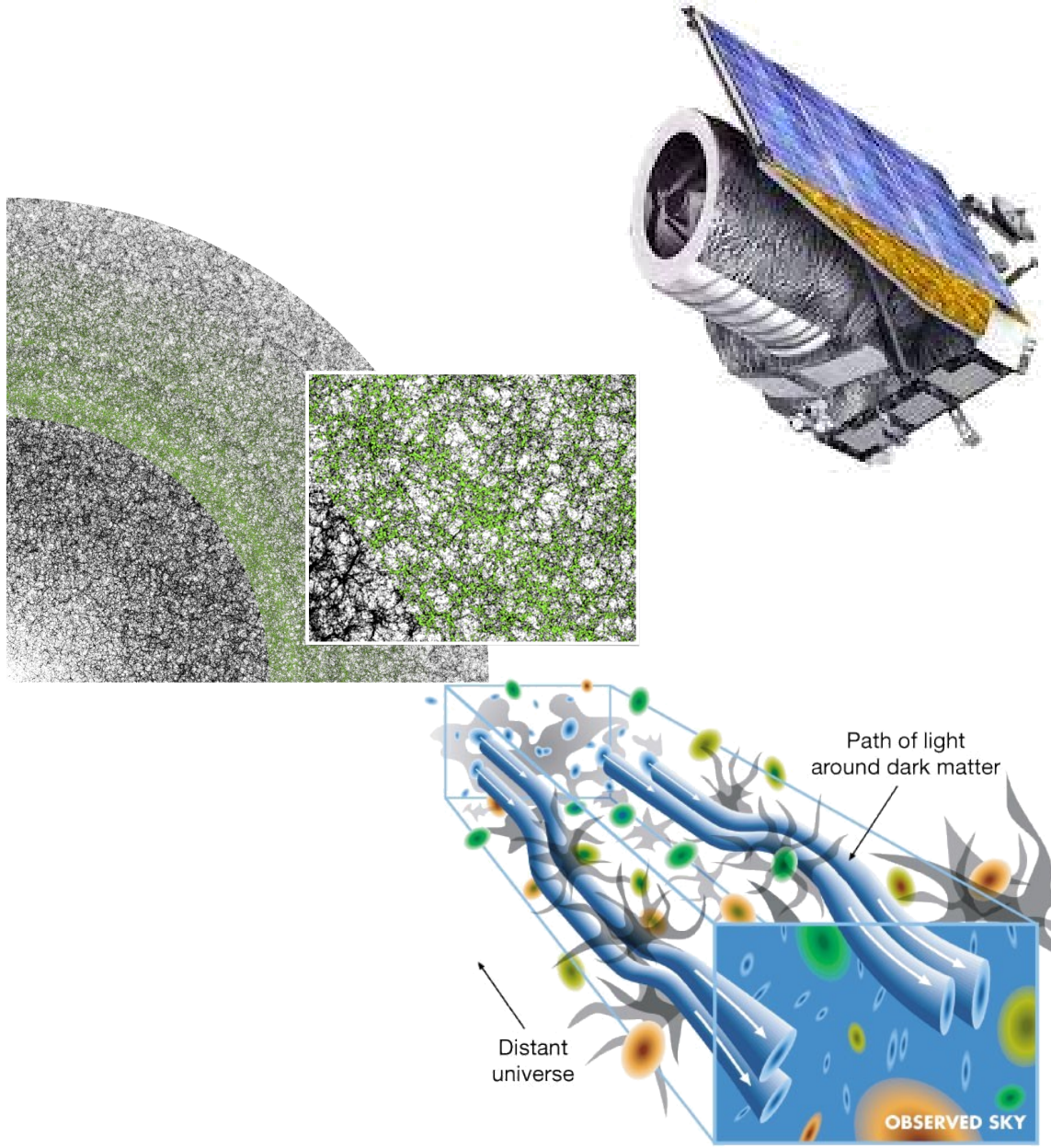
Euclid @UniMI

Meeting Referee INFN

11 Settembre 2024

Euclid in a nutshell

- **ESA** M2 space mission in the framework of the Cosmic Vision program
- Launched **July 1st 2023**. Duration **>6 years**
- 1.2m telescope with two instruments: Visible Imager (**VIS**) and Near Infrared Spectrometer and Photometer (**NISP**)
- Wide survey (**14.000 deg^2**) and deep survey (50 deg^2 in 3 different fields)
- Measurements of over **2 billion galaxy images** and around **30 million galaxy spectra** out to z>2
- Primary probes: **Galaxy Clustering** and **Weak Lensing**
- Additional probes: **CMB cross-correlation, clusters, strong lensing + legacy science**
- Main scientific objectives: **Dark Energy**, **Dark Matter**, and **General Relativity**



Euclid @UniMI

Davide Maino

Co-lead of the SDC-IT, SGS-PO, Science Coordinator

Luigi Guzzo

Core Science Coordinator, ~~GC-SWG Coordinator,~~ Chair of the ECPG Science (ECEB)

Ben Granett (INAF)

Co-lead of the "E2E" WP of the GC-SWG, lead developer of the PF LE3-ID-VMSP

Maria Archidiacono

Co-lead of the "Dark Matter and Particle Cosmology" WP of the TH-SWG

Emanuele Castorina

GC-SWG & TH-SWG

Carmelita Carbone (INAF)

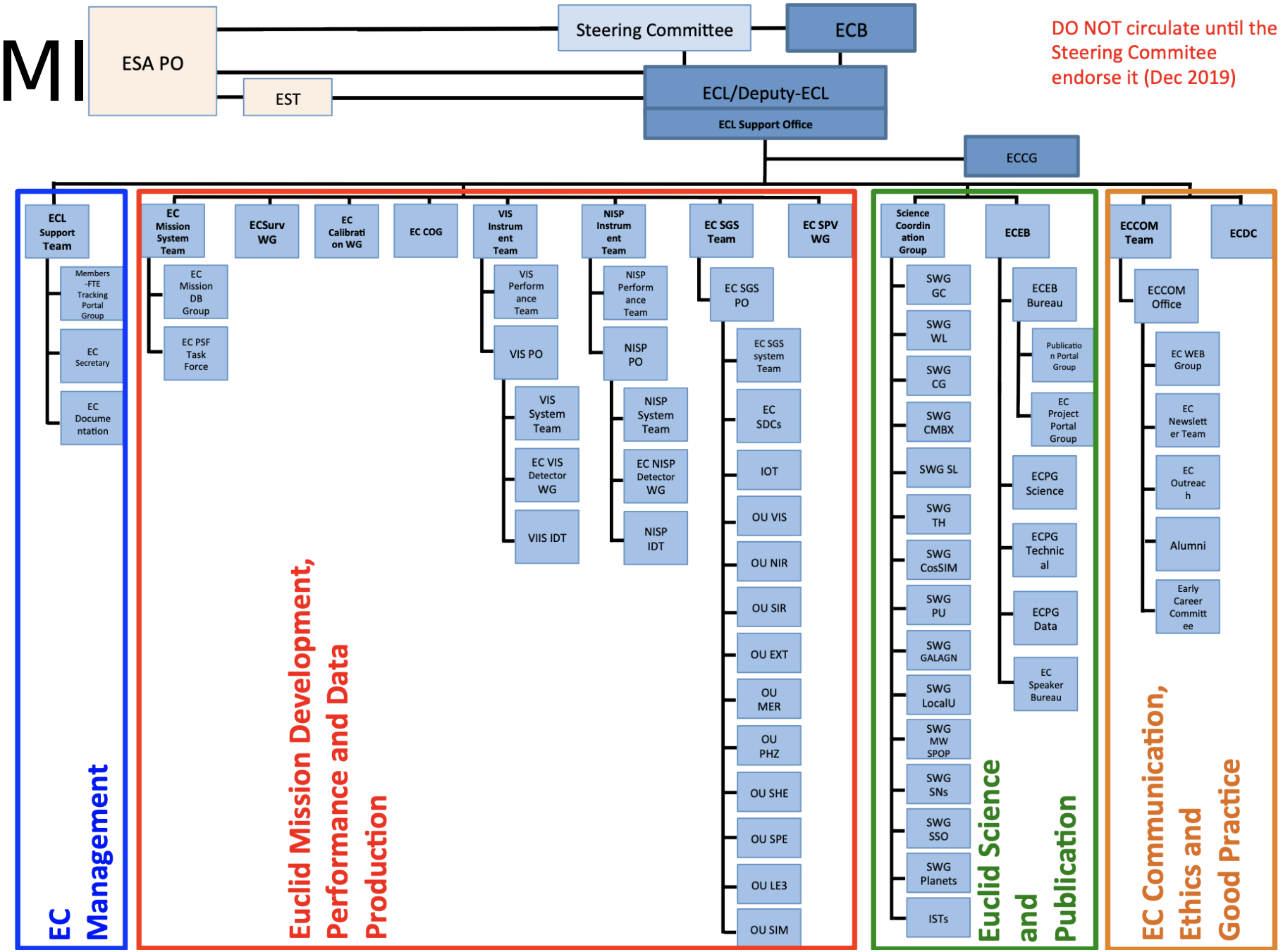
Co-lead of the "Likelihood" WP of the GC-SWG, and of the "CMBX simulations" WP of CMBX-SWG

~~**Marina Cagliari**~~

Matilde Barberi Squarotti (PhD student)

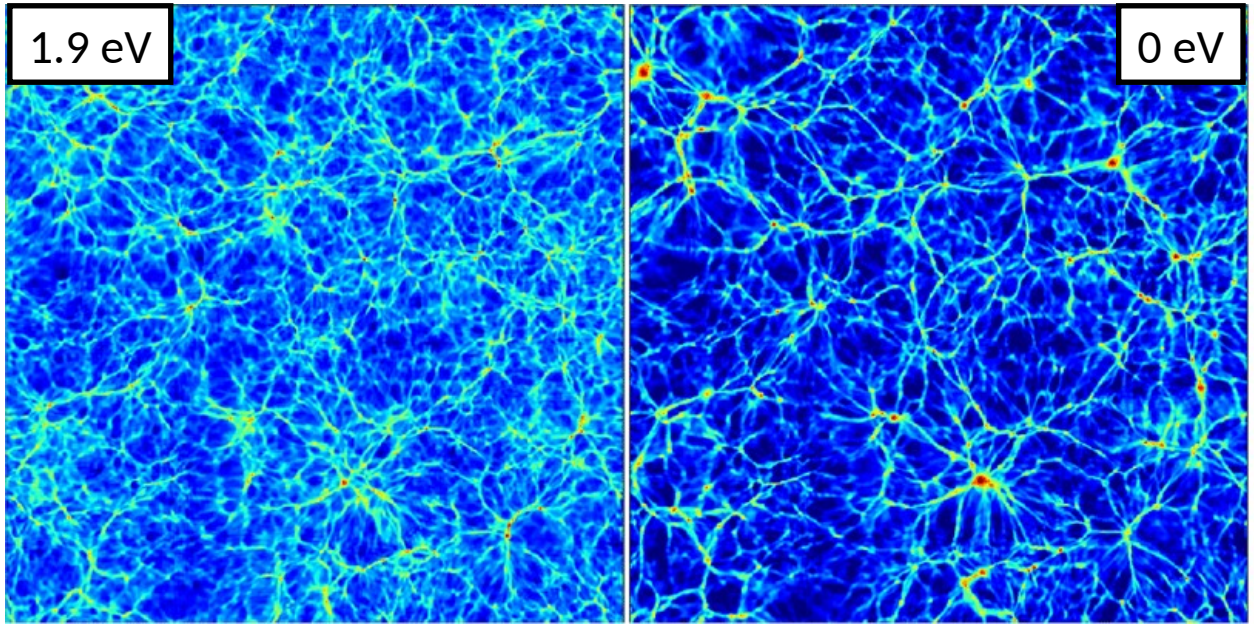
GC-SWG

DO NOT circulate until the Steering Commitee endorse it (Dec 2019)

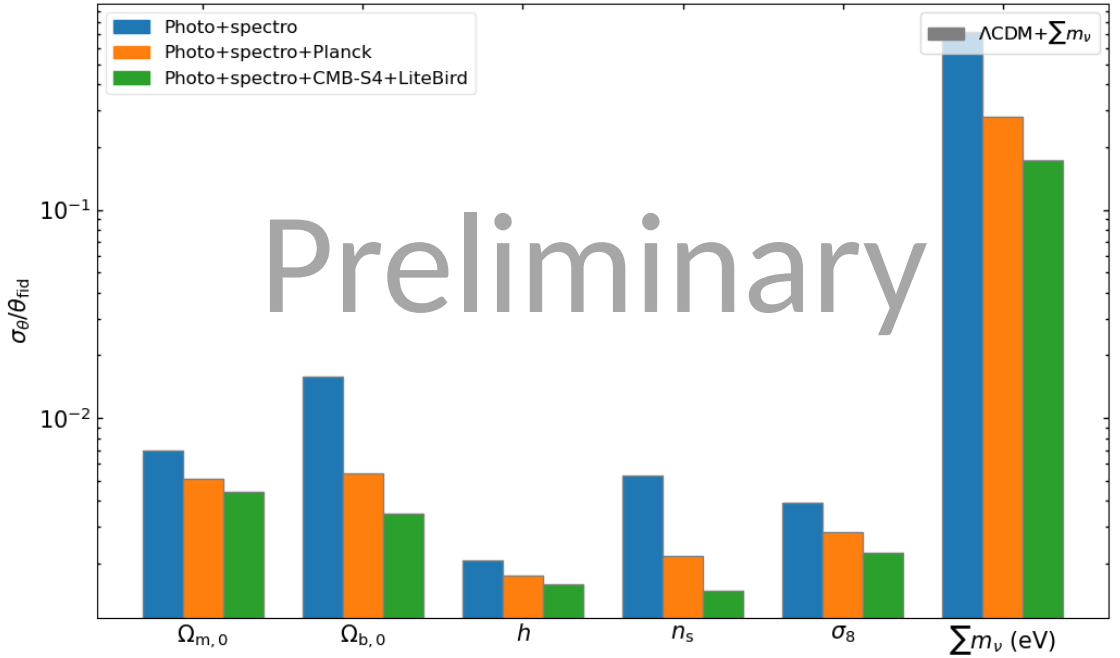


Euclid and “particle cosmology” @UniMI

Carbone - DEMNUni suite of n-body simulations in neutrino/ dark energy cosmologies



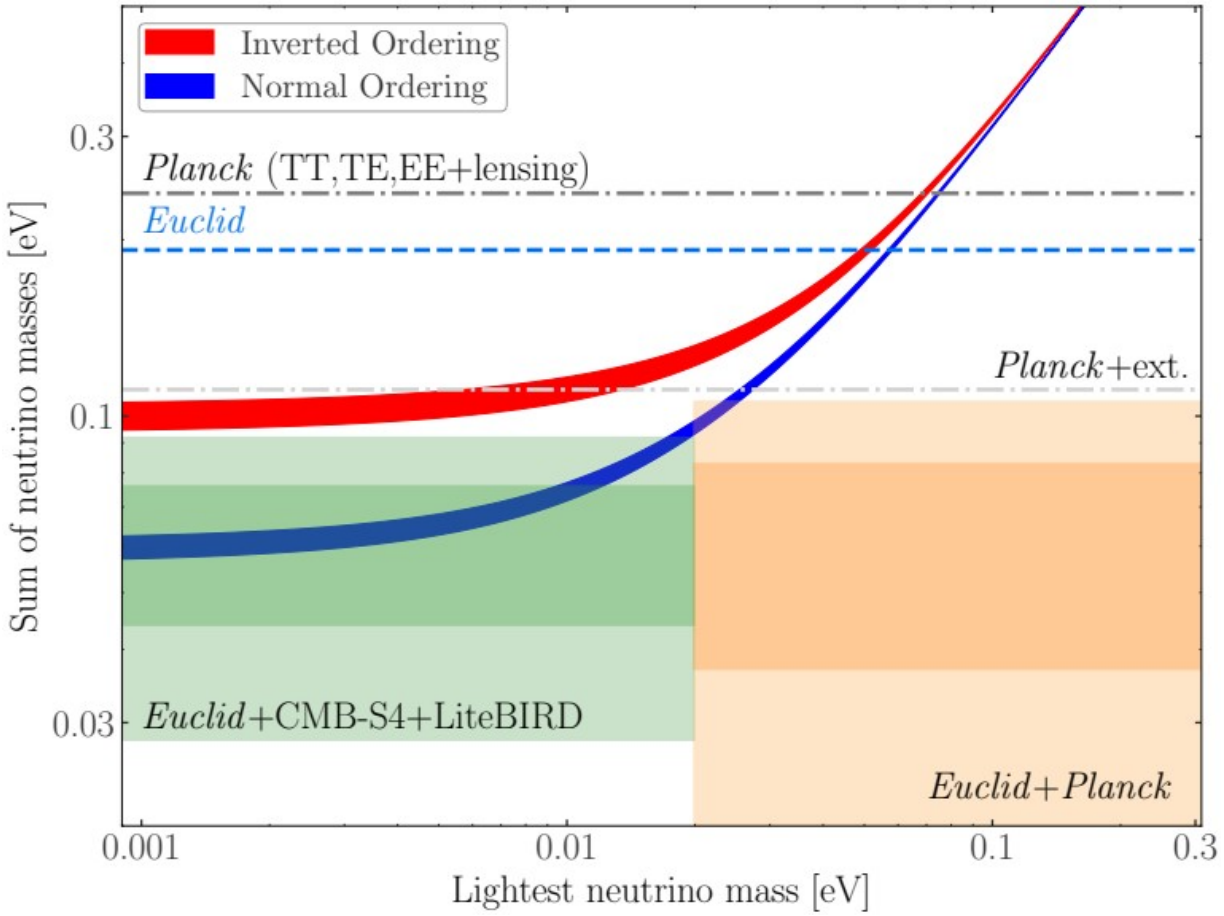
Neutrino forecast (WP3 of the TH-SWG, led by Maria Archidiacono and Julien Lesgourgues)



	$\Lambda\mathrm{CDM} + \sum m_\nu$					
	$\Omega_{m,0}$	$\Omega_{b,0}$	h	n_s	σ_8	$\sum m_\nu$(meV)
Euclid-only						
WL+GC_{ph}+XC_{ph}+GC_{sp}	0.0021865	0.00077348	0.001396	0.0050909	0.0031656	43.128
Euclid + CMB						
Euclid + Planck	0.0015981	0.00026652	0.0011844	0.0021014	0.0022841	16.876
Euclid + CMB-S4 + LiteBird	0.0013903	0.00017134	0.0010748	0.0014338	0.001824	10.365

Sensitivity to neutrino parameters

Euclid Collaboration: M. Archidiacono et al., arXiv:2405.06047



- Euclid in combination with upcoming CMB surveys can achieve a 4σ detection of Σm_ν , even if $\Sigma m_\nu = 0.058$ eV
- Cosmology is not directly sensitive to the neutrino mass ordering, like JUNO, however, if $\Sigma m_\nu = 0.058$ eV, then Euclid in combination with future CMB surveys can exclude IH at about 2σ

Euclid SDC-IT activities @ UniMi

- SDC-IT and OU-SIR
  - Weekly telecon with SDC-IT staff @ OaTS
  - Weekly telecon with OU-SIR: code improvement, scientific validation
  - Support for OU-SIR/OU-SPE integration
  - Weekly telecon with Operation Teams (SGS System Team)

Anagrafica

- D.Maino (50%), L.Guzzo (80%), M.Archidiacono (20%)
- Matilde Barberi Squarotti (PhD)

Richiesta fondi

- 2k (+ 2k sj) per missioni 2025
  - Interazione con gli altri nodi della sigla Euclid-INFN
  - Euclid Collaboration meeting
  - SWG meetings
- (1k sj) sostituzione PC per obsolescenza