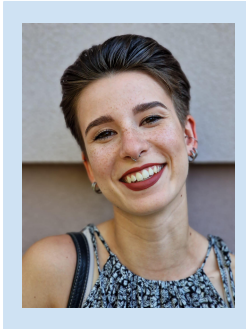


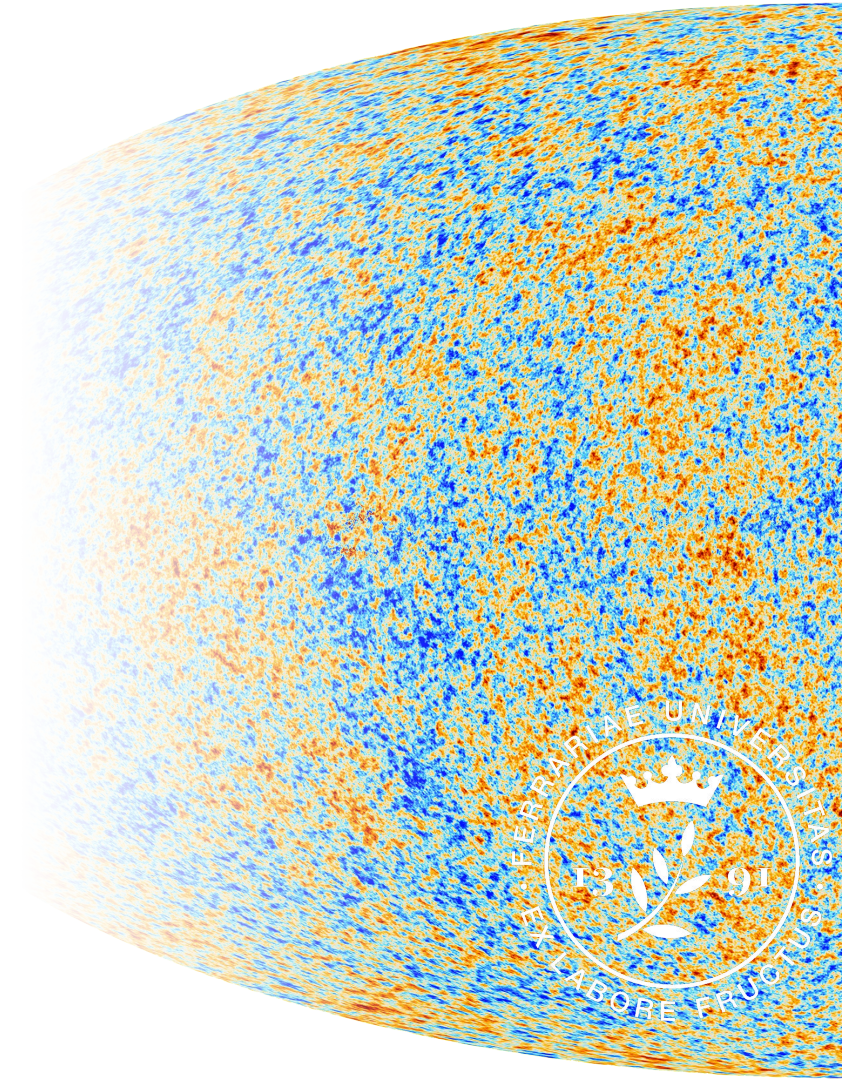
## About me

- **Ph.D. student, University of Ferrara**
- Master's degree in physics, University of Ferrara
- Bachelor degree in physics, University of Ferrara



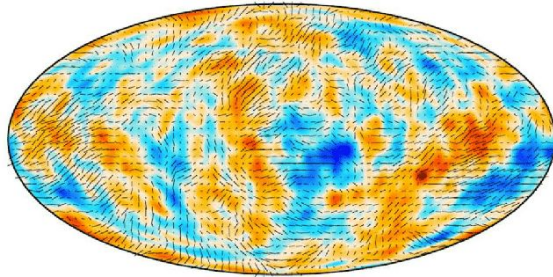
## Research interest

*Cosmology, physics of the early Universe, Cosmic Birefringence*



# Searching for signatures of new physics in the CMB: constraints on cosmic birefringence

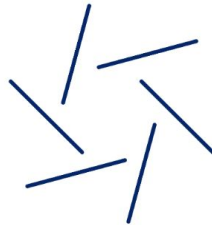
**CMB:** the earliest electromagnetic image of our Universe



Temperature and polarization field

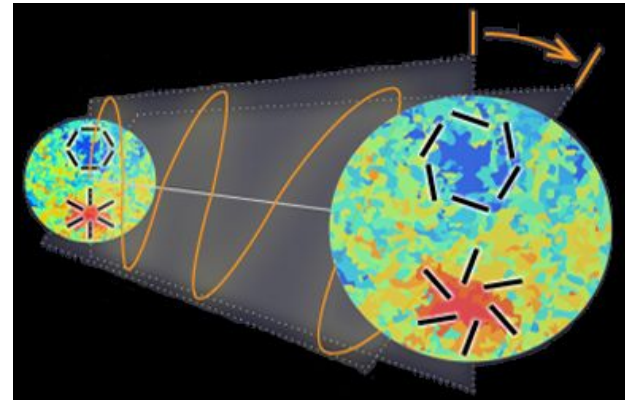


Parity even



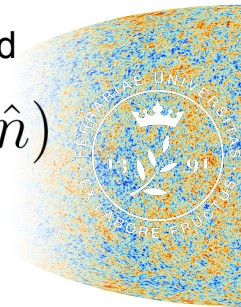
Parity odd

**Cosmic birefringence:** frequency-independent rotation of the polarization plane of linearly polarized radiation



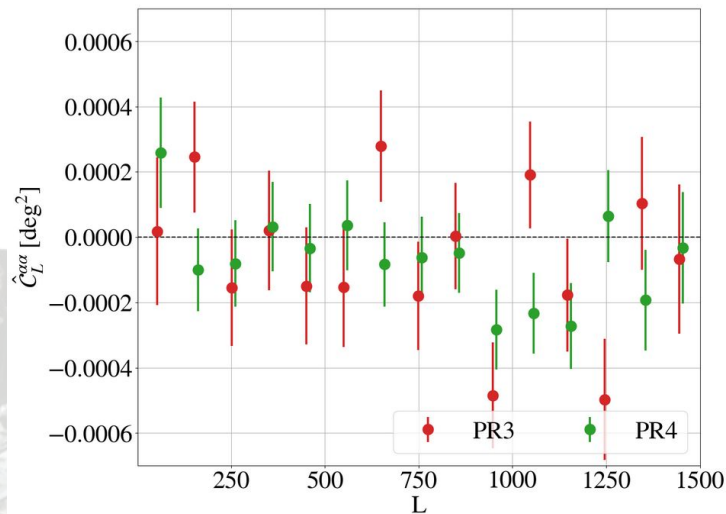
Cosmic birefringence (scalar) field

$$\alpha(\hat{n}) = \sum_{LM} \alpha_{LM} Y_{LM}(\hat{n})$$

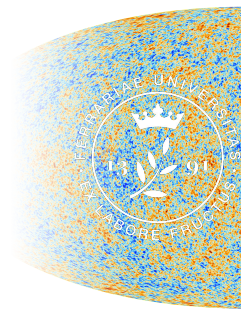


# Searching for signatures of new physics in the CMB: constraints on cosmic birefringence

- Implementation of a **harmonic estimator** for the cosmic birefringence field.
- Development of a pipeline to obtain the cosmic birefringence **power spectrum** → **REQUIRED DE-BIASING PROCEDURE**
- Application of the pipeline to **Planck** PR3 and PR4 data products

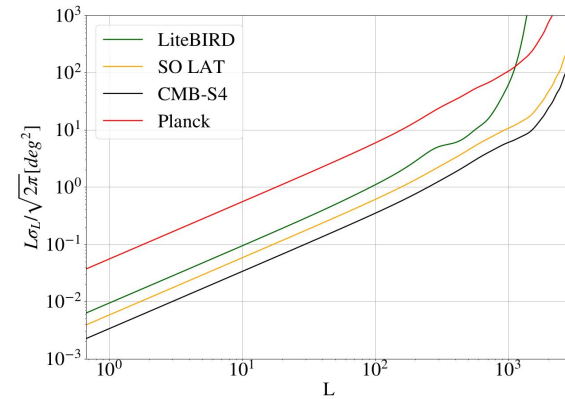


Zagatti et al. in preparation



# Searching for signatures of new physics in the CMB: constraints on cosmic birefringence

- Development of a pipeline to estimate the Cosmic Birefringence power spectrum from CMB polarization maps
- Application of the pipeline to Planck PR3 and PR4 data products
- Forecasts for forthcoming CMB experiments
- Expected an improvement of almost a factor of 1000 in the next decade



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Improvements wrt <i>Planck</i>	
<i>LiteBIRD</i>	$\sim 25$
<i>Simons Observatory LAT</i>	$\sim 100$
<i>CMB-S4</i>	$\sim 900$

