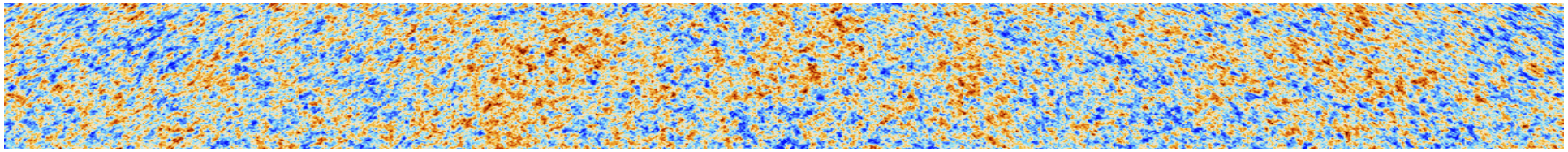

SZ Signal extraction from future CMB data (*WP 1–6X1*)

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Scientific Goals

Main (minimal or initial) goals:

1. Develop and test a new imaging algorithm aiming at restoring the SZ signal to the highest resolution allowed by the local signal-to-noise ratio
2. Study the outskirts of clusters of galaxies
3. Identify and reconstruct anisotropic features in the atmosphere of clusters of galaxies from SZ observations

Deliverables

1. Pressure and Compton-y maps of simulated clusters at different redshifts
2. Mock SZ observations
3. fully parametric component separation algorithm and software package
4. SZ map reconstruction software package that includes, curvelet analysis, denoising and Image deconvolution

Update list of people and nodes involved (expected to increase even more)

Senior Researchers

1. Bartolo N. (Padova)
2. Borgani S. (Trieste)
3. Bourdin H. (Cambridge)
4. De Gasperis G (RomaTV)
5. Liguori M. (Padova)
6. Mazzotta P. (RomaTV)
7. Rasia E. (Trieste)

PhD Strudents

1. Baldi. A. S. (RomaTV)
2. Kozmanyan. A. (RomaTV)
3. Ravenni Andrea (Padova)

Project timeline and current status

Timeline

1. First Year, 1st Semester:
    a. Hydrodynamical simulations
    b. Development of the fully parametric component separation algorithm,

Done!

2. First Year 2nd Semester:
    a. Development and implementation of instrument-optimized denoising algorithm,
    b. Implementation of curvelet analysis on sky patches.
3. Second year, 1st Semester:
    a. Production of idealized maps
    b. Test and optimization of the Algorithms on Planck data,
    c. Implementation of Image deconvolution,

Project timeline and current status

Timelines

4. Second year, 2st Semester:
    4. Production of mock SZ observations
    5. Development of new techniques to identify and reconstruct anisotropic features in atmosphere of clusters of galaxies.
5. Third year 1st Semester:
    4. Implementation of the multi-instrument (Space, Ballon-Borne and Ground) SZ signal extraction,
    5. Extension of the algorithm on the celestial sphere,
6. Third year 2st Semester:
    4. Extension of the algorithm for the component separation of polarization maps.

Slightely ahead of schedule

New projects (tasks)

1. Testing Modified Gravity with the Compton-y map (Lead by Liguori, see his presentation)
2. Simulations of the kinematic SZ observations from future CMB survey (Lead by Borgani)
    a. use simulated clusters to generate kSZ maps
    b. convolve this with the "response function" of a CMB telescope to define the mass-limit, as a function of redshift down to which peculiar velocities of clusters through the kSZ effect can be measured with a given error;
    c. use this kSZ selection function to make forecasts on the capability of cosmic velocity fields traced by kSZ to constrain deviations from the LCDM paradigm (e.g., modification of gravity on very large scales).