High-resolution thermal SZ imaging of galaxy clusters with the NIKA2 camera

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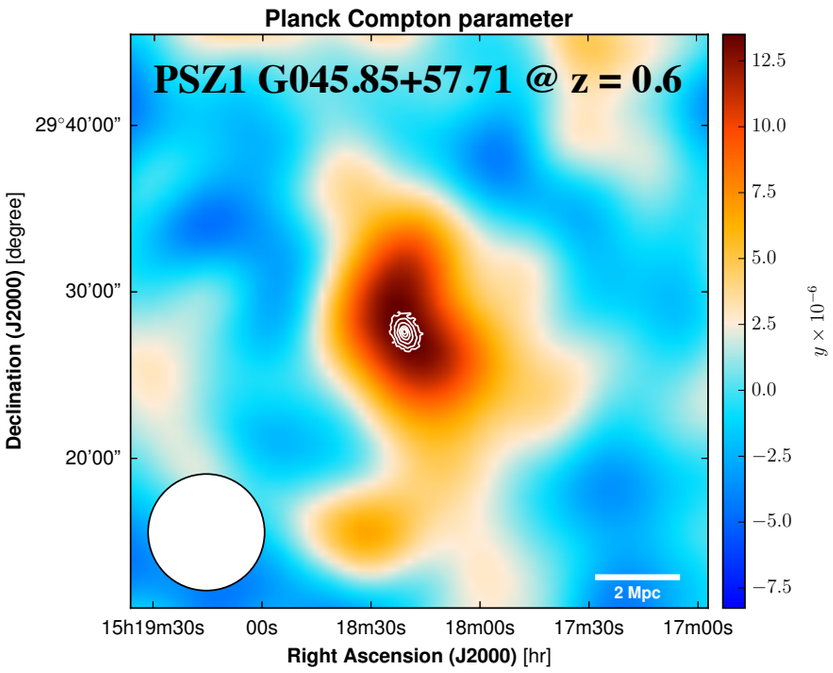
on behalf of the NIKA2 collaboration

PNCG - November 2016

High resolution SZ imaging with NIKA2



- **Clusters of galaxies:**
  - powerful probes for cosmology
  - sensitive to both the matter content and expansion history of the Universe

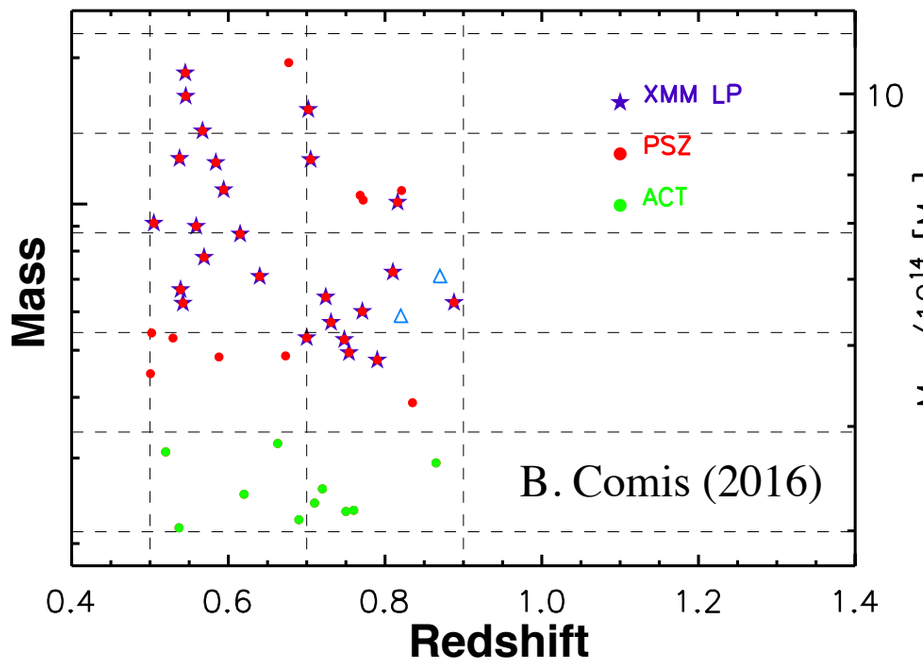
- **Thermal Sunyaev–Zel'dovich (SZ) effect observations:**
  - Discovering and characterization of large galaxy cluster samples
  - Low angular resolution ~ 10 arcmin → possible bias in the observable - mass scaling relation at high z

→ Need for high angular resolution SZ observations of clusters of galaxies at high redshift

- **NIKA2 SZ Large Program:**
  - 300 hours - 50 clusters of galaxies with redshift $0.5 < z < 0.9$
  - SZ observations:

    Frequency bands at 150 and 260 GHz

    Angular resolution of 18 and 12 arcsec



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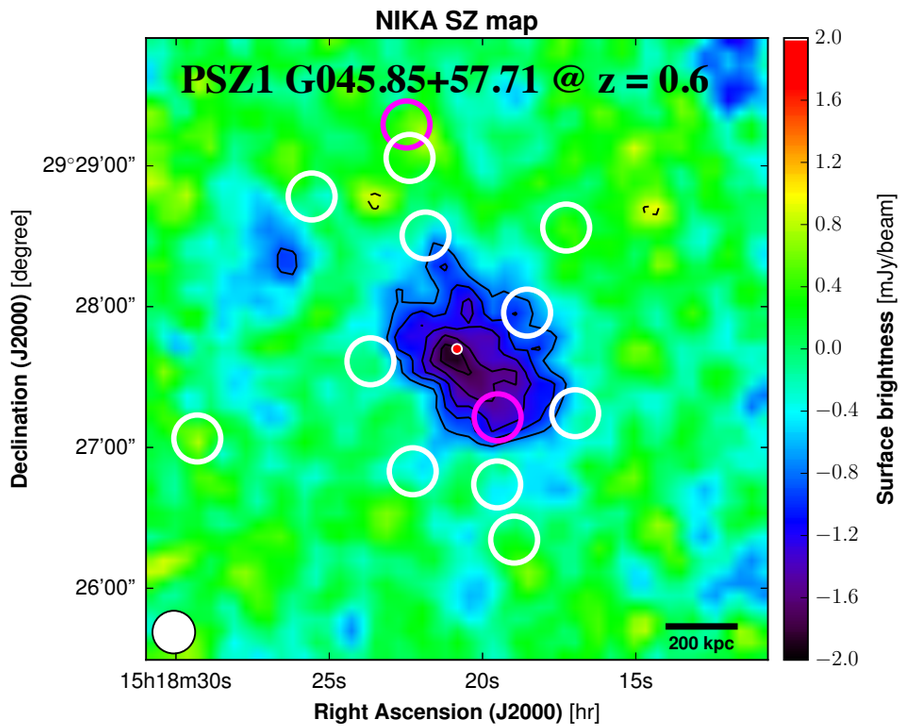


F. Ruppin, *et al*. A&A (2016)

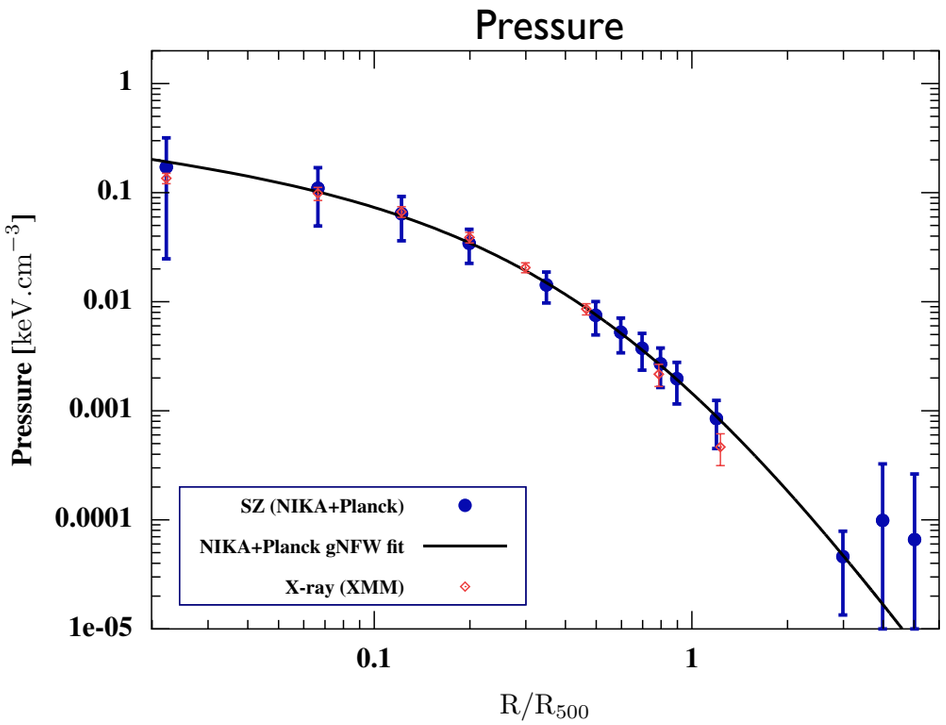
- NIKA prototype: SZ mapping of a Planck discovered cluster

$$y_{tSZ} \propto \int P_e \, dl$$

- XMM-*Newton*: density profile of this cluster

→ Multi-probe MCMC analysis

→ non-parametrical deprojection of the SZ observations



→ Pressure distribution from the core to the outskirts

- Thermodynamical properties of the ICM:
  - Pressure
  - Temperature
  - Entropy
  - Mass

→ NIKA2 will enable a precise study of galaxy cluster dynamical states at high redshift

Thank you