



Galactic Plane image sharpness as a check on cosmic microwave background mapmaking

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quadrupole = biggest structure



- CMB quadrupole = largest uncollapsed inhomogeneity in observable Universe
- detected by COBE and WMAP ? or not ?



TOD have offset



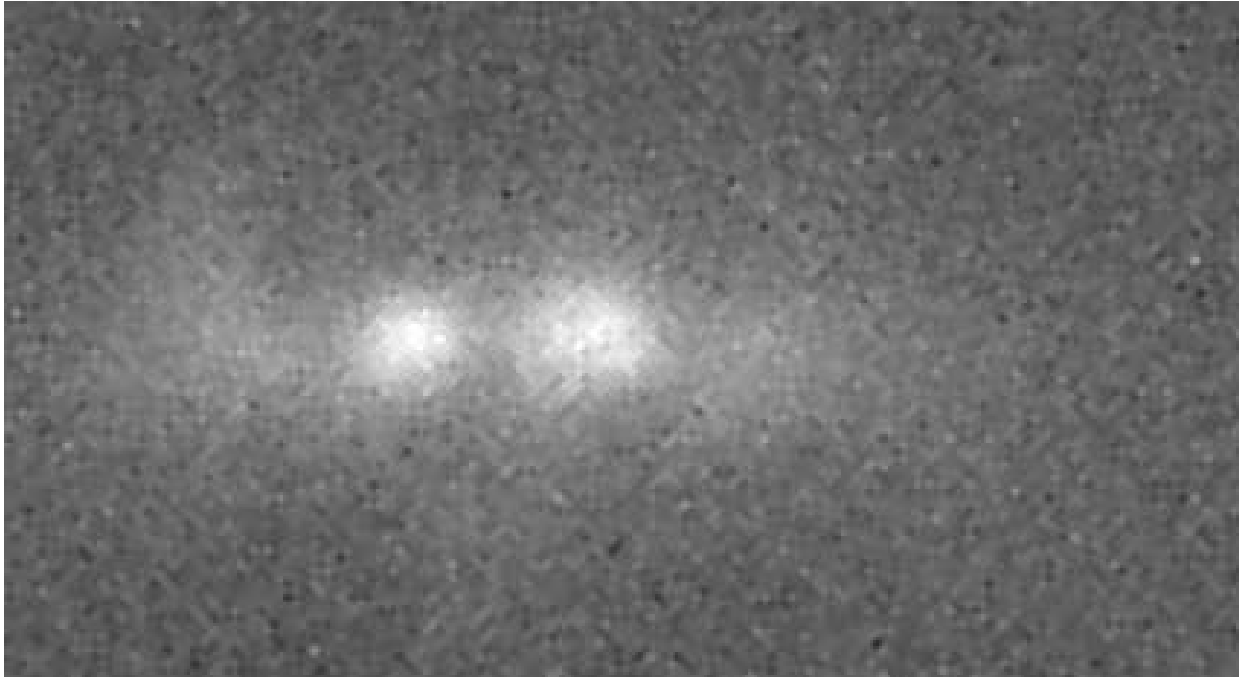
- WMAP time-ordered-data (TOD) have 25.6 ms offset between *Meta Data Set* (spacecraft attitude) and *Science Data Set* (radio flux observations)
- not documented by WMAP team



⇒ **quadrupole = artefact ?**

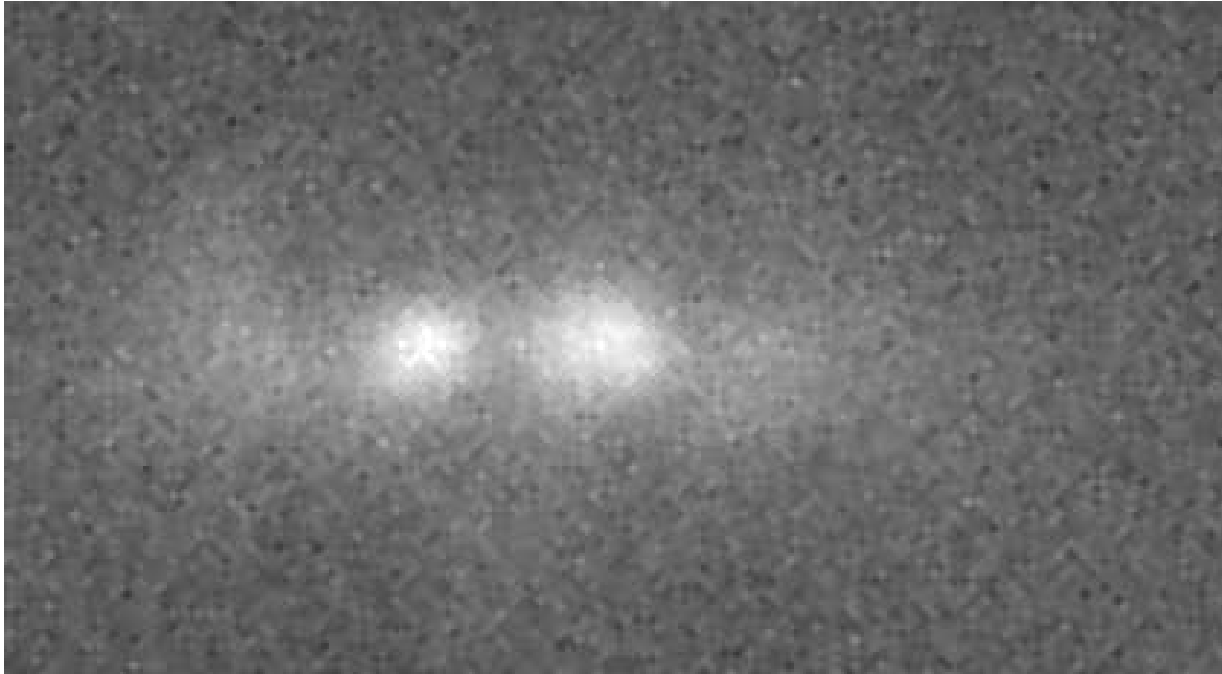
- Liu, Xiong & Li 2010 ArXiv :1003.1073 : claimed cosmological quadrupole is mostly artefact

but $\delta t \Rightarrow$ bad focus



$\delta t = 0$ Galactic Centre according to Liu, Xiong & Li.
 $5.8^\circ \times 1.7^\circ$, longitude increasing to left. 1 pixel = $1.7'$.
Grey scale : black (-20 mK) to white (+40 mK).

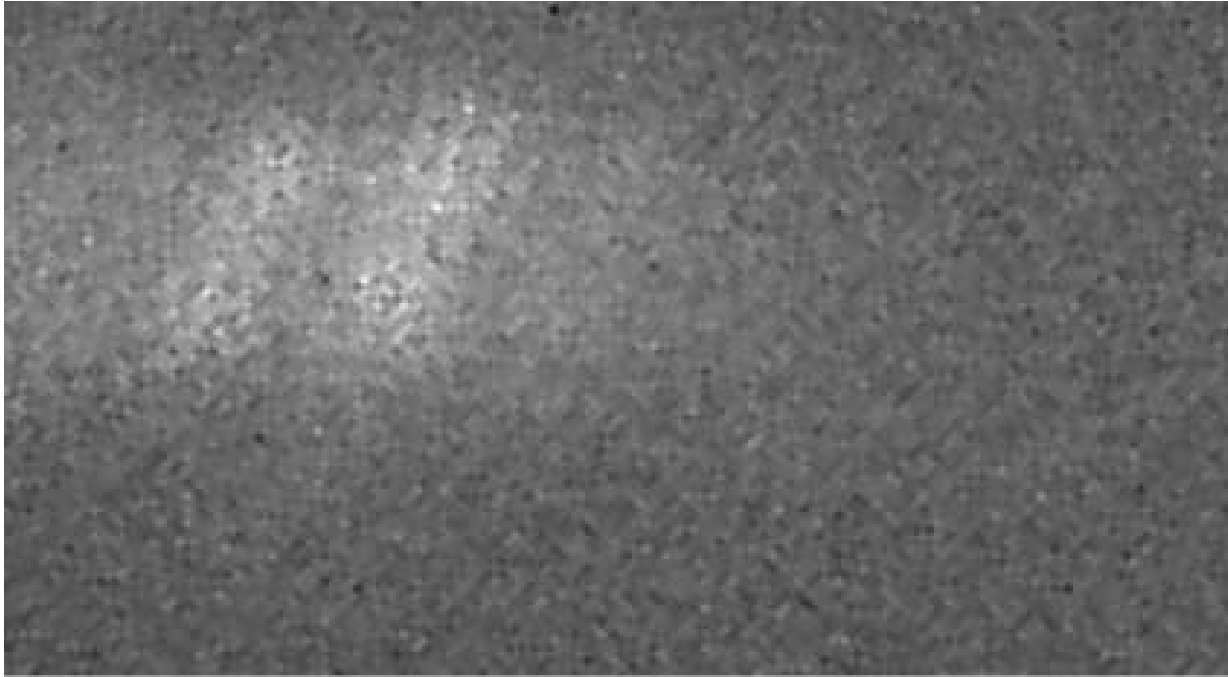
but $\delta t \Rightarrow$ bad focus



$\delta t = 0.5$ Galactic Centre according to WMAP team.



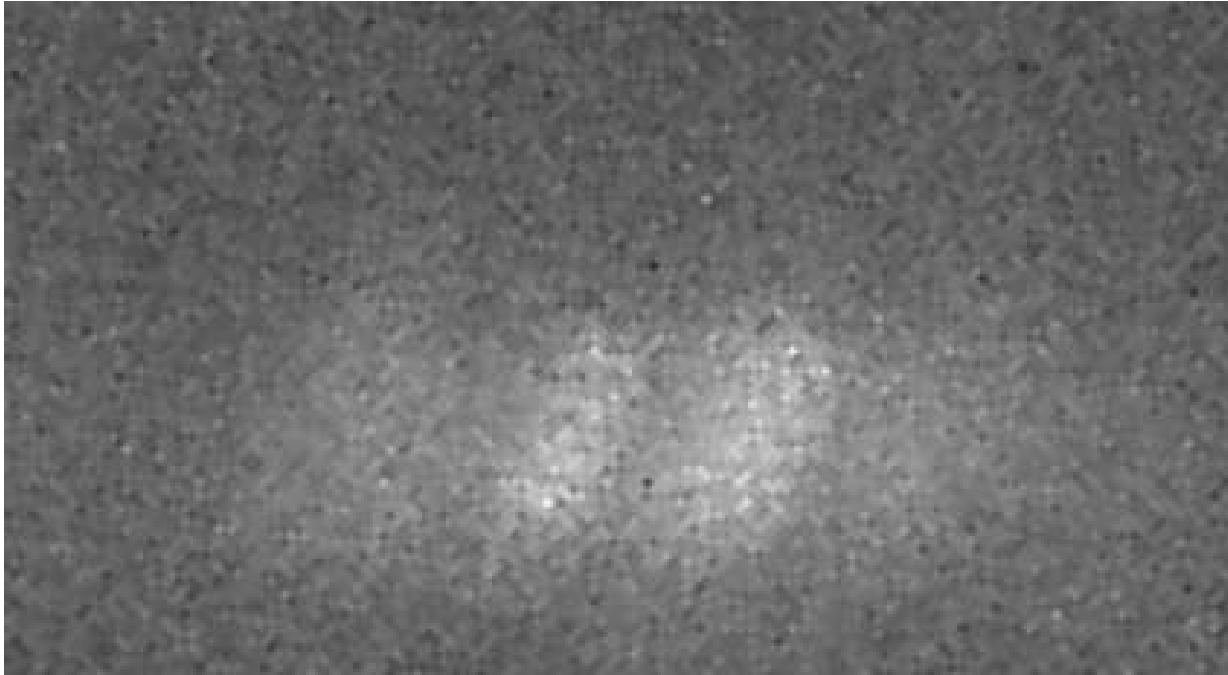
but $\delta t \Rightarrow$ bad focus



$\delta t = -5$ Galactic Centre, time offset exaggerated.



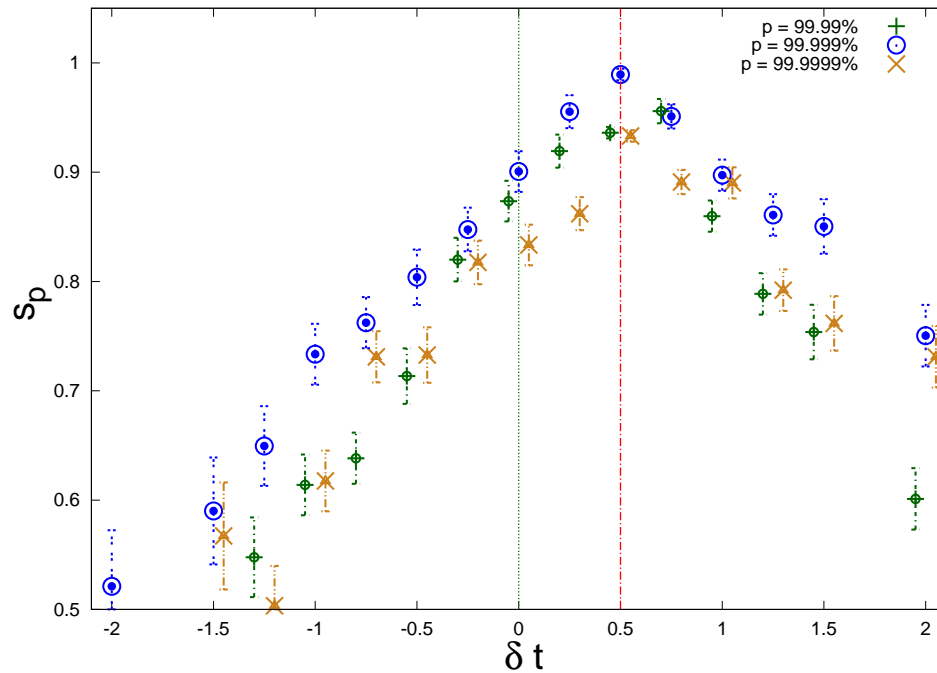
but $\delta t \Rightarrow$ bad focus



$\delta t = +5$ Galactic Centre, time offset exaggerated.



best focus



mean normalised temperature-fluctuation percentiles s_p ,
from maps made from calibrated WMAP 3-year W band
time ordered data.

Conclusion



⇒ an error was not made during map-making from the calibrated TOD

- but since the dipole was used during calibration, an artificial quadrupole may have already been unintentionally inserted into the calibrated TOD.

Roukema 2010, A&A, in press, ArXiv :1004.4506

