

# Q-U Bolometric Interferometer for Cosmology

## Newsletter

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### Preliminary performance forecast for the QUBIC prototype (Part 2)

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We performed a second forecast that tells us how well we can characterize the Galactic emission in the four aforementioned regions. The signal is dominated by the dust emission, conventionally described by two parameters: amplitude and spectral index. To measure these, we can exploit a unique feature of bolometric interferometry, called spectral imaging. This technique allows us to split the observation into several sub-bands within the instrumental frequency range, providing additional spectral information. This forecast is based on the Fisher Matrix, which tells us the minimum expected error bar for the two dust parameters.

Fig. 1 shows the result for the four regions assuming 200 days of observation each and to split the observation into two sub-bands. The relative error bar on the dust amplitude and spectral index is shown in the left and right panels, respectively. Blue pixels have lower error bars, while red pixels correspond to higher error bars. The QUBIC prototype should be able to measure the dust amplitude with low uncertainty almost everywhere in the regions. In all regions except the last one, we should also be able to estimate the spectra index, although over a limited area (the last region is dominated by noise).

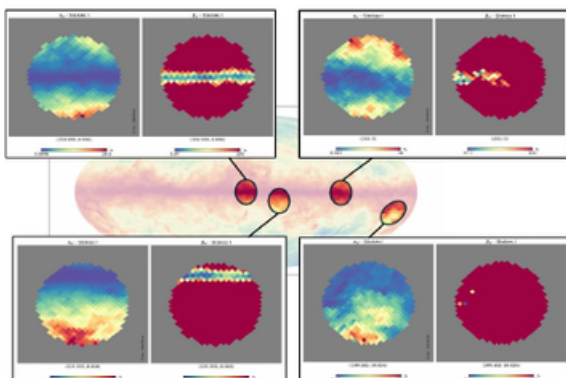
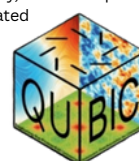


Fig. 1 Minimum uncertainty on the Galactic dust parameters in the four selected regions after 200 days of observation, obtained from a Fisher matrix forecast. For each region, the relative error bar on the dust amplitude and spectral index is shown in the left and right panels, respectively. Blue pixels correspond to low uncertainty, while red pixels are noise-dominated



<http://qubic.org.ar>

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