The current cosmological model, as encoded by ΛCDM, provides a reasonably good fit to current data. A host of cosmological observations including the CMB fit within the model that consists of only six parameters [**?**]. But the model is phenomenological and it leaves fundamental questions open. Premier among them is the unknown content of the majority of the Universe. Approximately 95% of the Universe appears to be composed of dark matter and dark energy of unknown nature, both of which are necessary to explain observations at scales ranging from that of a galaxy to that of the Hubble volume. Yet, there are no detection of dark matter particles, and as for dark energy, it even lacks a compelling theoretical motivation.

In this context, tension between measurements of any ΛCDM parameter obtained by different probes compel additional stringent tests and investigation of alternatives to the prevailing paradigm. Examples of emerging tensions are the 3.5σ?? need value and reference discrepancy between the CMB- and supernovae-based measurements of the Hubble constant [**?**]; and the 2.5σ?? need value and reference discrepancy between *Planck* and weak lensing surveys in the measurement of the amplitude of late time perturbations σ_8. Such tensions, while perhaps only indicating the presence of systematic effects in the measurements, may in fact point toward new physics. One way to search for new physics is to better constrain the current measurements and to test for extensions beyond the base six-parameter set.

Given PICO's baseline noise and angular resolution, and an input set of N fiducial ΛCDM parameters, it is straightforward to calculate the uncertainty with which PICO will constrain this set [**?**]. A figure of merit (FOM) that quantifies the strength of the constraint is the volume of the uncertainty region in the N-dimensional space [**?**].[1] The FOM is defined such that a larger value linearly corresponds to *smaller* volume and thus to smaller parameter errors. what else are we including? delensing? foreground separation? Can we point to other papers in which this specific code and FOM have been used? what 'cmb' information is used? only spectra? what about phi? Can we invert the FOM? it is more intuitive to have smaller numbers correspond to smaller volumes.

The six-parameter ΛCDM model that is constrained by current measurements includes the baryon density, the dark matter density, the amplitude and spectral index of a power-law spectrum of initial perturbations, the angular scale of acoustic oscillations, and the optical depth to reionization. To this set we added: $N_{\rm eff}$ the effective number of light relics (§ **??**), two dark energy parameters[2] need to fill footnote, the tensor to scalar ratio r (§ **??**), the sum of neutrino masses $\sum m_\nu$ (§ **??**), and α_1 is this running?. For this 12-parameter set and for the PICO baseline configuration we find that the FOM is 3×10^9 larger than that calculated for *Planck*. For the CBE the value increases to 9.5×10^9. Excluding an inflationary signal by fixing $r=0$, the values are 5×10^6 and 7×10^6. Even stronger improvements will be obtained when the PICO CMB data will be combined with available data sets in the next decade including weak lensing, BAO, and cluster of galaxies. These improvements will test ΛCDM so stringently that it is hard to imagine it surviving such a scrutiny if it is not fundamentally correct. It would be equally exciting if ΛCDM failed and a new cosmological model emerged.

[1] The FOM is determined by the covariance of the Fisher information matrix, $\mathrm{FoM} = (\det[\mathrm{cov}(p_i)])^{-1/2}$, $i = 1,...,N$, where p is the parameter set.

[2] give dark energy parametrization