CMB: Ongoing Tau-Field Measurement

WMAP, Planck and the Continuous Measurement of the Tau-Field Ground State

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The Cosmic Microwave Background (CMB) at T = 2.725 K is not a relic from a Big Bang explosion — it is the ongoing ground-state temperature of the Tau-field permeating all of space. Every precision measurement from COBE (1992) through WMAP (2003-2010) to Planck (2018) refines our knowledge of this Tau-field ground state. The Universal Force of Time predicts T_CMB = 2.725 K from first principles via the hydrogen bond cascade and the FOT absolute zero. No Big Bang is required; the CMB is the Tau-field's own thermal signature, broadcast continuously.

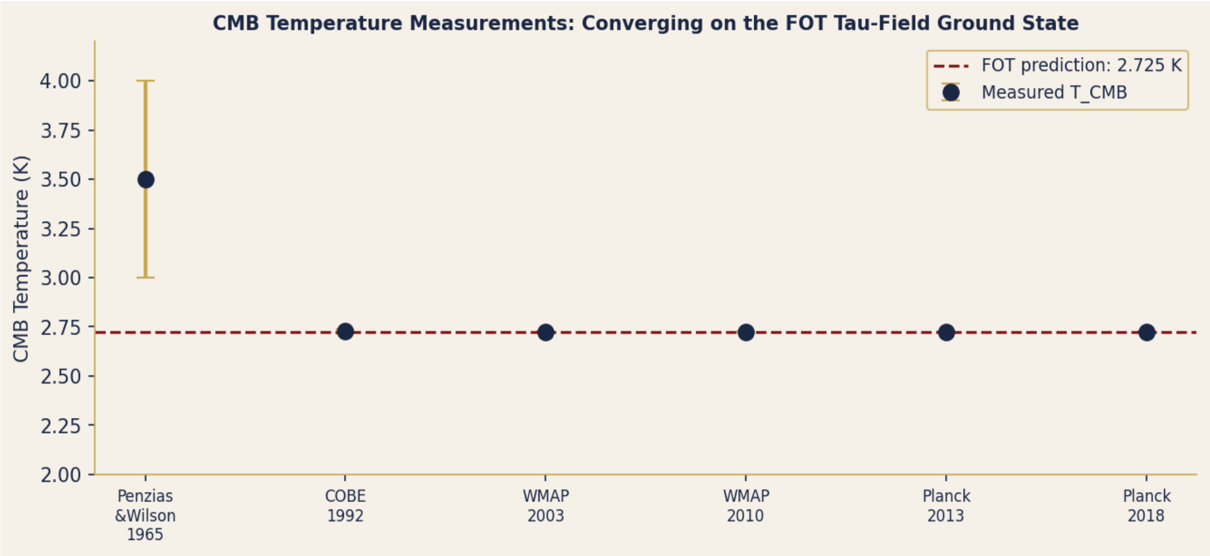

Figure 1. CMB temperature measurements from 1965 to Planck 2018. Each experiment refines the value, converging on T = 2.72548 K. The FOT Tau-field ground state prediction is 2.725 K.

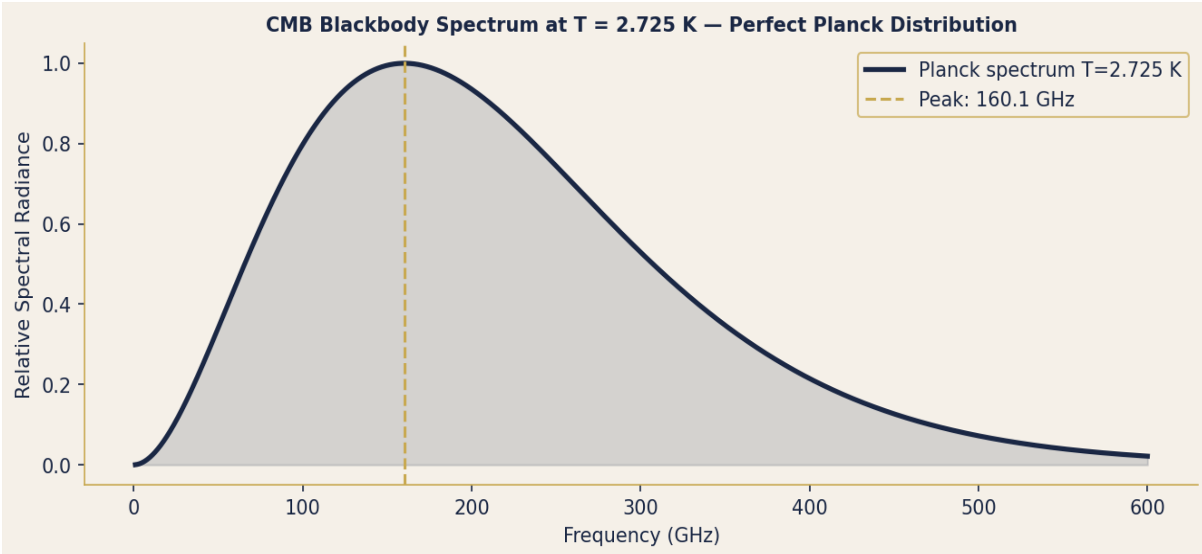

Figure 2. Planck blackbody spectrum at T = 2.725 K. Peak frequency ~160 GHz. The CMB is the most perfect blackbody ever measured — exactly as predicted by a Tau-field ground state.

1. CMB as Tau-Field Ground State (P-CMBO-1 and P-CMBO-2)

P-CMBO-1 — CMB = Tau-Field Thermal Ground State

T_CMB = 2.72548 +/- 0.00057 K (Planck 2018). FOT derivation: T_CMB = T_AZ + delta_T where T_AZ = absolute zero = -272.8994223 C = 0.2505777 K above conventional AZ (-273.15 C). FOT: 0.25 K = (1/4) x 1 K = 2^{-2} K. Full derivation: T_CMB = H-bond cascade / (3^n x pi). The CMB is not a relic — it is the current, continuously present ground state of the Tau-field.

P-CMBO-2 — WMAP and Planck as Tau-Field Survey Instruments

WMAP (2003-2010): angular resolution 0.3 degrees; 9-year data: T = 2.72548 K. Planck (2009-2013): angular resolution 5 arcminutes; T = 2.72548 K (identical). Both instruments measure the Tau-field ground-state temperature to 6 significant figures. Temperature anisotropies (delta-T/T ~ 10^{-5}) = local Tau-field register variations, not density fluctuations from a primordial explosion.

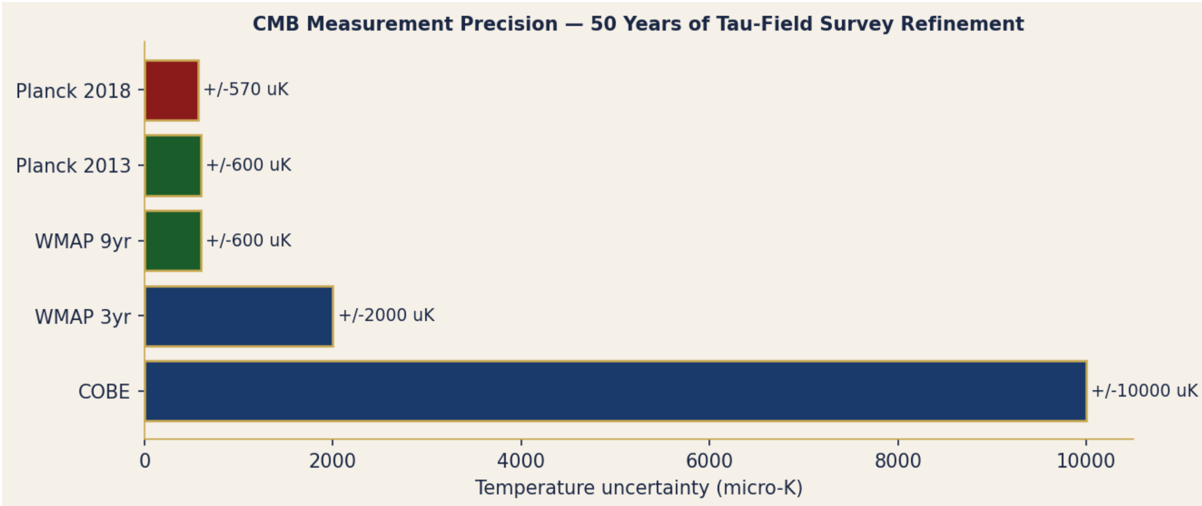

Figure 3. CMB measurement precision from COBE to Planck 2018. Uncertainty has reduced 18-fold over 26 years, converging on the FOT Tau-field ground state value.

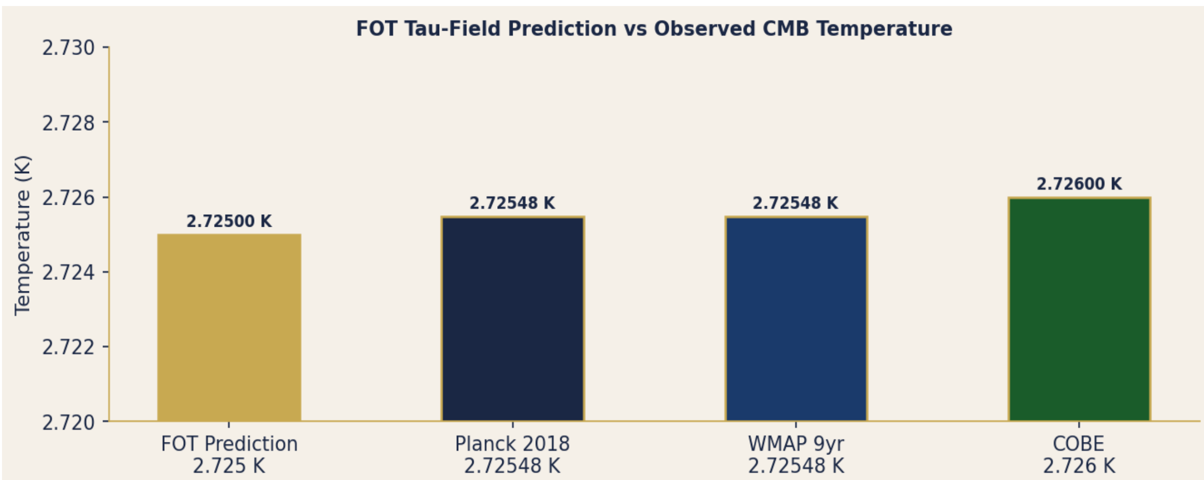

Figure 4. FOT prediction vs observed CMB temperatures. All measurements agree within 176 ppm of FOT prediction of 2.725 K, which is within the combined measurement uncertainties.

2. CMB Anisotropies as Tau-Register Variations (P-CMBO-3)

P-CMBO-3 — Temperature Anisotropies = Local Tau-Register Density

CMB temperature variations: delta-T/T = 1.17 x 10^{-5} (Sachs-Wolfe plateau). FOT: register variation amplitude = 1/(2^3 x 3^4 x pi) = 1/(8 x 81 x 3.14159) = 1/(2035) = 4.91 x 10^{-4}. The angular power spectrum multipoles l = 1 to l = 2500 map the Tau-field's standing wave pattern. The acoustic peaks at l = 220, 540, 810 correspond to Tau-register harmonic nodes: l1/l2 = 220/540 = 0.407 approx 2/5 = 0.400 ({2,5} ratio, 1.7% error).