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New Constraints on Primordial Gravitational Waves using Planck, WMAP, and BICEP/Keck Observations through the 2018 Observing Season

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The BICEP/Keck series of experiments targets the polarisation of the Cosmic Microwave Background at degree-scale resolution from the South Pole. In our most recent release, we present results from an analysis of all data taken by the BICEP2, Keck Array and BICEP3 CMB polarisation experiments up to and including the 2018 observing season. The Q/U maps now reach depths of 2.8, 2.8 and 8.8 $\mu\text{Kcmb arcmin}$ at 95, 150 and 220 GHz respectively, over an effective area of ≈ 600 square degrees at 95 GHz and ≈ 400 square degrees at 150 & 220 GHz. Adding publicly available maps of *Planck* and WMAP at frequencies from 23 to 353 GHz, our likelihood analysis yields the constraint $r_{\{0.05\}} < 0.036$ at 95% confidence. Running maximum likelihood search on simulations we obtain unbiased results and find that $\sigma(r) = 0.009$.

In this talk, I will give an overview of the current state and upcoming upgrades of the BICEP/Keck program, and detail our analysis pipeline from map and power spectra to constraints on cosmological parameters. I will also address how we validate our analysis choices and tackle systematic effects.

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