

Abstract Submitted  
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**The Early Universe ( $f^2 FF$ ) Model of Primordial Magnetic Field at Large Field Inflation**<sup>1</sup> ANWAR ALMUHAMMAD, University of Texas at San Antonio — Primordial magnetic fields (PMF) are detected in almost all astrophysical systems and scales from planets to superclusters of galaxies. They also have been detected in very low density intergalactic medium with  $B_0 > 10^{-16}G$ . The simple inflation model, ( $f^2 FF$ ) becomes more attractive because it leads to a scale invariant PMF. Recently, BICEP2 reported the detection of the tensor mode (B-mode) of the polarization of temperature anisotropy in CMB. The tensor to scalar ratio reported was  $r = 0.2^{+0.07}_{-0.05}$ , which, if confirmed, raises the scale of inflation to GUT scale,  $\rho_{\text{GUT}}^{1/4} \sim 10^{16}$  GeV. The chaotic inflationary models, such as large field inflation (LFI) fit the new result more than the standard models. We compute both magnetic and electric spectra generated by the  $f^2 FF$  model in the LFI for all possible values of model parameter,  $p$ . We show that the necessary scale invariance property of PMF cannot be obtained in LFI under the first order of slow roll limits. Furthermore, if the limits were released to achieve the scale invariance, the model would suffer from backreaction problems.

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