Constraining slow-roll inflation with WMAP and 2dF Samuel M. Leach Département de Physique Théorique, Université de Genève, 24 quai Ernest Ansermet, CH-1211 Genève 4, Switzerland Andrew R. Liddle Astronomy Centre, University of Sussex, Brighton BN1 9QJ, United Kingdom 98.80.Cq astro-ph/0306305

abstract We constrain slow-roll inflationary models using the recent WMAP data combined with data from the VSA, CBI, ACBAR and 2dF experiments. We find the slow-roll parameters to be $0 < \epsilon_1 < 0.032$ and $\epsilon_2 + 5.0\epsilon_1 = 0.036 \pm 0.025$. For inflation models $V \propto \phi^\alpha$ we find that $\alpha < 3.9$, 4.3 at the 2σ and 3σ levels, indicating that the $\lambda \phi^4$ model is under very strong pressure from observations. We define a convergence criterion to judge the necessity of introducing further power spectrum parameters such as the spectral index and running of the spectral index. This criterion is typically violated by models with large negative running that fit the data, indicating that the running cannot be reliably measured with present data.