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Playing dice with the universe: Bayesian statistical analyses of cosmological models and new observables

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Playing dice with the Universe: Bayesian Statistical analyses of cosmological models and new observables

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The cover shows an illustration of the bright night sky. The painting was made by my father, *Miguel Cañas Muñoz*, who has a genuinely interest in astronomy and shared this passion with me when I was a little girl. I thank *Jaime Cañas Muñoz* for realizing the graphical design of the cover using the painting.

A mamá, papá y Juanchito

Glossary

Λ Cosmological constant.

Λ CDM Standard Cosmological model.

(C)DM (Cold) Dark Matter.

AIC Akaike Information Criterion.

AP Alcock-Paczynski effect.

BAO Baryonic Acoustic Oscillations.

BBN Big Bang Nucleosynthesis.

BH Black Hole(s).

BIC Bayesian Information Criterion.

BICEP Background Imaging of Cosmic Extragalactic Polarization.

BM Baryonic Matter.

CAMB Code for Anisotropies in the Microwave Background.

CfA Center for Astrophysics Redshift Survey.

CLASS Cosmic Linear Anisotropy Solving System.

CMB Cosmic Microwave Background.

CPL Chevallier-Polarski-Linder parametrization.

DE Dark Energy.

DES Dark Energy Survey.

EC Euclid Consortium.

EFT Effective Field Theory.

EM Electromagnetic.

ESA European Space Agency.

ET Einstein Telescope.

FLRW Friedmann-Lemaitre-Robertson-Walker.

GC Galaxy Clustering.

GPs Gaussian Processes.

GR General Relativity.

GR Gravitational Lensing.

GW Gravitational-Waves.

IA Intrinsic Alignment.

Glossary

IST:L Inter-Science Taskforce Likelihood.

IST:NL InterScience Taskforce Non-Linear.

LIGO Laser Interferometer Gravitational-Wave Observatory.

LISA Laser Interferometer Space Antenna.

LSS Large Scale Structure.

MCMC Monte Carlo Markov Chain.

ML Machine Learning.

NASA National Aeronautics and Space Administration.

SDSS Sloan Digital Sky Survey.

SHO Simple Harmonic Oscillator.

SKA Square Kilometre Array.

SNIa SuperNovae of type Ia.

WL Weak Lensing.

WMAP Wilkinson Microwave Anisotropy Probe.

XC Cross (X) - Correlations.

Contents

Dedication	iii
Glossary	iv
1 Introduction	1
1.1 Evolution of a homogeneous and isotropic universe	3
1.2 A problem of initial conditions and inflation	8
1.3 Canonical single-field slow-roll inflation	10
1.3.1 Primordial perturbations	11
1.3.2 Primordial power spectrum	14
1.3.3 Beyond canonical single-field slow-roll inflation	15
1.4 The Large Scale Structure of the universe	16
1.4.1 The non-linear regime	19
1.5 Observations	20
1.5.1 Supernovae Type Ia (SNIa)	20
1.5.2 CMB angular power spectrum	21
1.5.3 Galaxy Clustering	22
1.5.4 Weak Lensing	24
1.6 The Standard Cosmological model	26
1.7 Data Analysis in Cosmology	27
1.7.1 Bayesian Statistics	28
1.7.2 Parameter Inference	30
1.7.3 Model Comparison	35
1.8 About this thesis	36
I Constraints on inflationary models	39
2 Bayesian reconstruction of the inflaton's speed of sound using CMB data	41
2.1 Introduction	41
2.2 Theoretical model	43
2.3 Methodology	45
2.3.1 Reconstruction model for the reduction in the speed of sound	45
2.3.2 Parameters and Priors	48

CONTENTS

2.3.3	Data sets and sampler	50
2.4	Results	52
2.4.1	Consistency checks	52
2.4.2	Reconstruction of the inflaton’s speed of sound profile $u(\tau)$	54
2.5	Conclusions	56
2.6	Appendix: detailed results up to 4 nodes of $u(\tau)$ in log-log parameterization	58
2.6.1	One dip (<i>denoted by “A”</i>)	58
2.6.2	Two dips (<i>denoted by “B”</i>)	64
2.6.3	Three dips (<i>denoted by “C”</i>)	64
2.6.4	Four dips (<i>denoted by “D”</i>)	64
2.6.5	Reductions with substructure (<i>denoted by “S”</i>)	65
3	Constraints on α-attractor models	67
3.1	Introduction	67
3.2	Constraints from current CMB and LSS data	69
3.3	Forecast for future CMB-S4 observations	72
3.4	Conclusions	75
3.5	Appendix: from a two sigma bound to an upper limit	77
II	Constraints on Gravitational Waves Physics	79
4	Cross-correlations of the anisotropies of the Astrophysical Gravitational-Wave Background with Galaxy Clustering	81
4.1	Introduction	81
4.2	Gravitational-Wave anisotropies	83
4.3	Cross-correlation with galaxy clustering	87
4.4	Information content	88
4.4.1	Model set-up	88
4.4.2	Behaviour of the cross-correlation	91
4.4.3	Constraining $\mathcal{K}(r)$	92
4.5	Conclusions	95
5	Reconstruction of the propagation and origin of gravitational waves	99
5.1	Introduction	99
5.2	Gravitational wave propagation	102
5.3	Angular power-spectra	103
5.3.1	GW sources	103
5.3.2	Galaxies	105
5.4	Reconstructing GW physics	106
5.4.1	Mock data and fiducial model	106
5.4.2	Reconstruction Pipeline	108
5.5	Results	110
5.5.1	Reconstructions	110

5.5.2 Signal-to-Noise scaling	112
5.6 Discussion and Conclusions	115
III Data Science for the Euclid mission	117
6 Cosmological Likelihood for Observables in <i>Euclid</i>	119
6.1 The <i>Euclid</i> Mission	120
6.1.1 Telescope, goals and the Euclid Consortium	120
6.1.2 The role of IST:L and IST:Non-Linear	122
6.2 Photometric and Spectroscopic surveys	123
6.3 Theoretical predictions for <i>Euclid</i> primary observables	125
6.3.1 Galaxy Clustering: Spectroscopic (GCsp)	127
6.3.2 Weak Lensing (WL)	129
6.3.3 Photometric Galaxy Clustering (GCph)	132
6.3.4 Weak Lensing - Photometric Galaxy Clustering Cross-Correlation (XC)	134
6.4 Benchmark data and covariance matrices	135
6.4.1 Weak Lensing (WL)	135
6.4.2 Photometric Galaxy Clustering (GCph)	137
6.4.3 Weak Lensing - Photometric Galaxy Clustering Cross-Correlation (XC)	137
6.4.4 Spectroscopic Galaxy Clustering (GCsp)	138
6.5 Standard likelihood analysis	139
6.6 CLOE: specifications and structure	140
6.7 Validation of the benchmark data using CLOE	143
6.8 The future of CLOE	147
6.9 Appendix: fiducial and best fit values for the cosmological and nuisance parameters	150
References	153
Summary	177
Samenvatting	181
List of Publications	185
Curriculum Vitae	187
Acknowledgments	189

