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

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Citation

Cañas Herrera, G. (2022, October 19). *Playing dice with the universe: Bayesian statistical analyses of cosmological models and new observables*. *Casimir PhD Series*. Retrieved from <https://hdl.handle.net/1887/3483658>

Version: Publisher's Version

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Note: To cite this publication please use the final published version (if applicable).

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

Proefschrift

ter verkrijging van
de graad van doctor aan de Universiteit Leiden,
op gezag van rector magnificus prof.dr.ir. H. Bijl,
volgens besluit van het college voor promoties
te verdedigen op woensdag 19 oktober 2022
klokke 13:45 uur

door

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geboren te Griñón, Madrid, Spanje
in 1993

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Casimir PhD series, Delft-Leiden 2022-21

ISBN 978-90-8593-532-2

An electronic version of this thesis can be found at <https://openaccess.leidenuniv.nl>

This work is supported by the Delta Institute for Theoretical Physics (D-ITP consortium), a program of the Netherlands Organization for Scientific Research (NWO, OWC), and by the Leiden De Sitter programme.

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.

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