CHRISTIAN PEDERSEN

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RESEARCH INTERESTS

My interests are in neutrino cosmology, particularly the effects of massive neutrinos on structure growth, dark matter, dark energy, and hydrodynamical simulations of the Lyman-α forest. I am interested in general in the intersection between particle physics and cosmology and the role of cosmology in answering questions of fundamental physics.

EDUCATION

University College London September 2017 - Present
Ph.D. in Astrophysics

Cardiff University 2012-2017
MPhys in Physics with Astronomy, 1:1

Swansea University 2009-2012
BA in Classics, 2:2

TECHNICAL SKILLS

Computational skills	Python, Linux/Bash, C/C++, High Performance Computing, LaTeX
Statistical skills	Bayesian Inference, Markov-Chain Monte Carlo Simulations

RESEARCH EXPERIENCE

PhD Studentship - University College London September 2017 - present

- Fully funded studentship in UCL's Cosmoparticle Initiative on the effect of massive neutrinos on large scale structure.
- Hydrodynamical simulations of the Lyman-α forest including massive neutrinos.
- Supervised by Dr. Andreu Font-Ribera and Dr. Thomas Kitching

Final Year Project - Cardiff University & LIGO September 2016 - July 2017

- Computational project working in the LIGO collaboration on parameter estimation of binary black hole mergers using Bayesian inference, with a specific focus on parameter degeneracies in systems with precessing binaries.
- Development of a data analysis pipeline and high performance computing to run MCMCs on real and simulated LIGO data.
- Supervised by Prof. Stephen Fairhurst.

CUROP Research Internship - Cardiff University June 2016 - August 2016

- Theoretical project working on perturbation theory in electrodynamics.
- I developed all codes for this project independently in Python, including numerical root finding and integration, production of animations and data analysis.
- Supervised by Dr. Egor Muljarov.

RISE Research Internship - Karlsruhe Institute of Technology May 2015 - August 2015

- Research internship funded by the German Academic Exchange Service (DAAD) in the Pierre Auger collaboration working on ultra high energy cosmic rays.
- Data analysis in ROOT, working with and extensions of data processing pipelines written in a mix of Python and C++
- Supervised by Dr. Lenka Tomankova.

DEMONSTRATING - OUTREACH - TALKS

IGM 2018 Kavli IPMU Tokyo Talk September 2018

· Talk titled *Massive neutrinos in hydrodynamical simulations of the Lyman-α forest*

Phys Film Makers Summer School July 2018

· Supervised a group of GCSE students for a week at UCL tasked with producing a video on spectroscopy.

Neutrinos@UCL Workshop Talk June 2018

· Talk titled *Neutrino mass and cosmic structure in the young universe.*

Mullard Space Science Laboratory Talk April 2018

· Talk titled *Massive Neutrinos and the Lyman-α Forest.*

DESI France Talk January 2018

· Talk titled *Neutrino Mass and Cosmic Structure.*

Python Demonstrating September 2017 - December 2017

· Assisted with lab sessions for undergraduate students at UCL learning Python.

REFERENCES

Dr. Andreu Font-Ribera - a.font@ucl.ac.uk
Dr. Thomas Kitching - t.kitching@ucl.ac.uk
Prof. Stephen Fairhurst - stephen.fairhurst@astro.cf.ac.uk