

An aerial photograph of a university campus, likely Cambridge, featuring various academic buildings, green spaces, and a large stadium in the background. The image is overlaid with a semi-transparent blue filter. Two thin white circles are drawn on the image: a large one centered on the text and a smaller one below it. A solid yellow circle is positioned at the end of the main text line.

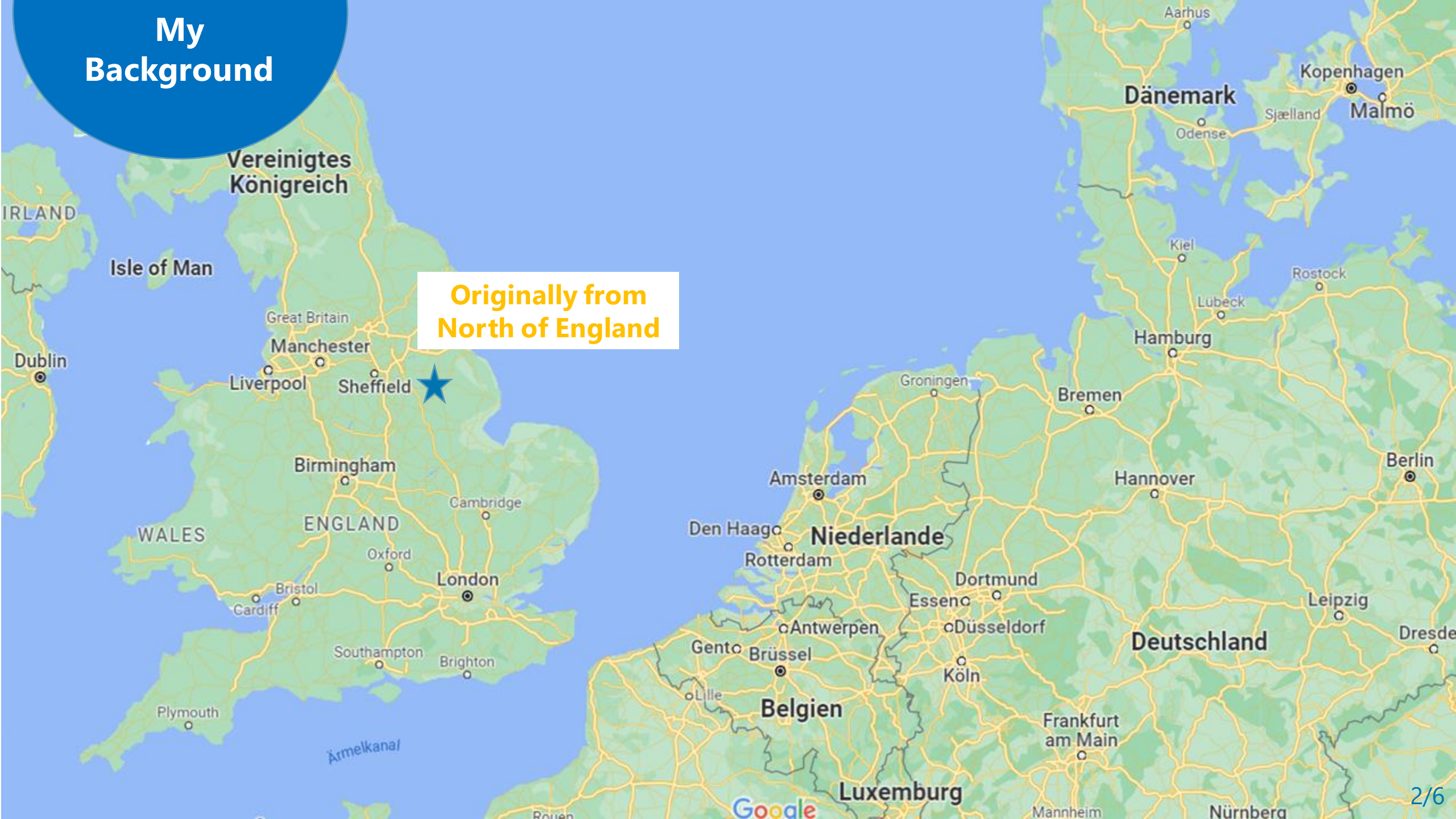
# Proton Structure at high Precision ●

Thomas Cridge, 28<sup>th</sup> April 2023



# My Background

Originally from  
North of England



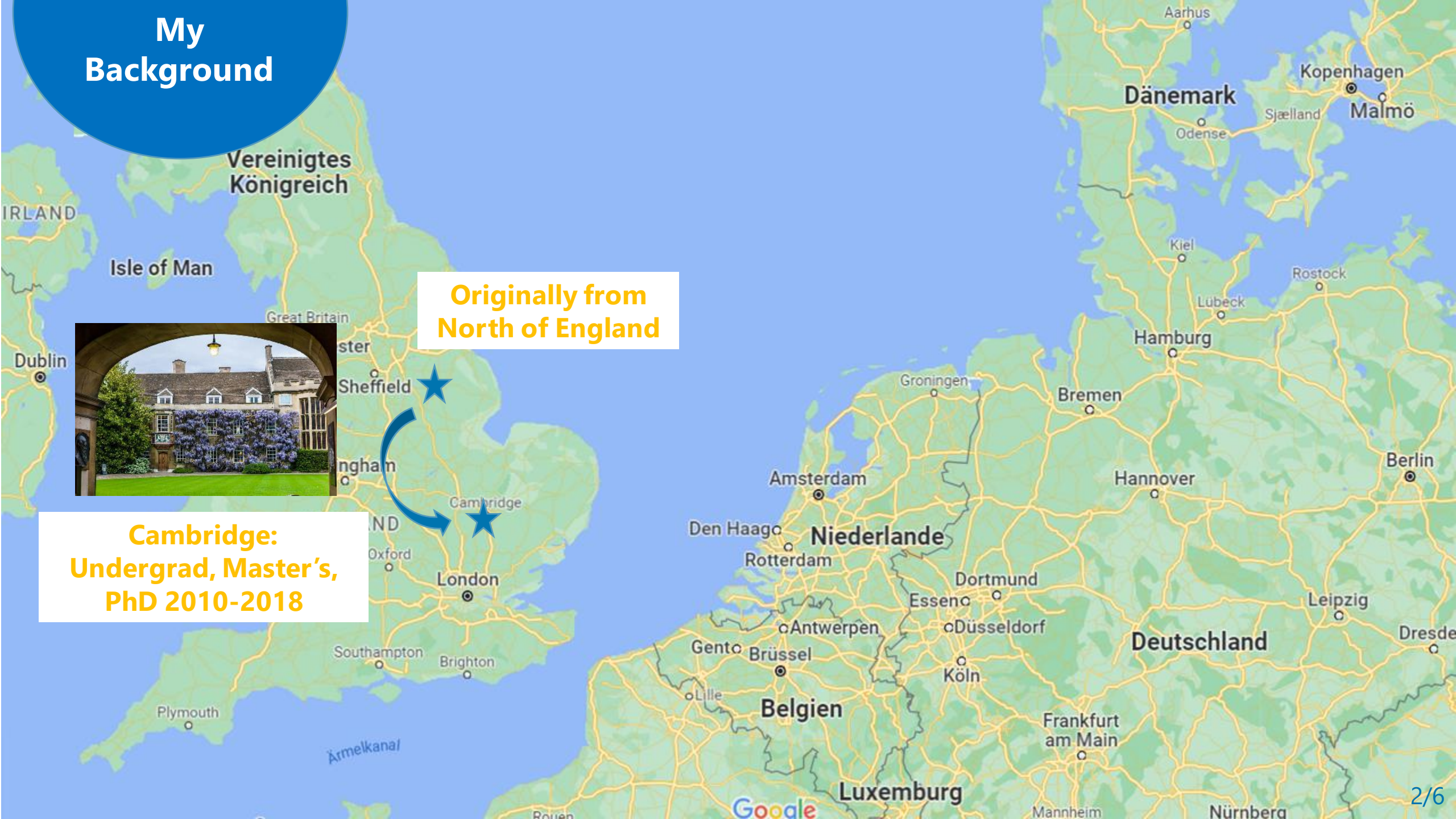


# My Background

Originally from  
North of England



Cambridge:  
Undergrad, Master's,  
PhD 2010-2018





# My Background

Originally from  
North of England



Cambridge:  
Undergrad, Master's,  
PhD 2010-2018



London:  
First Postdoc  
2018-2022





# My Background

Originally from  
North of England

DESY, Hamburg:  
Second Postdoc  
2022-...



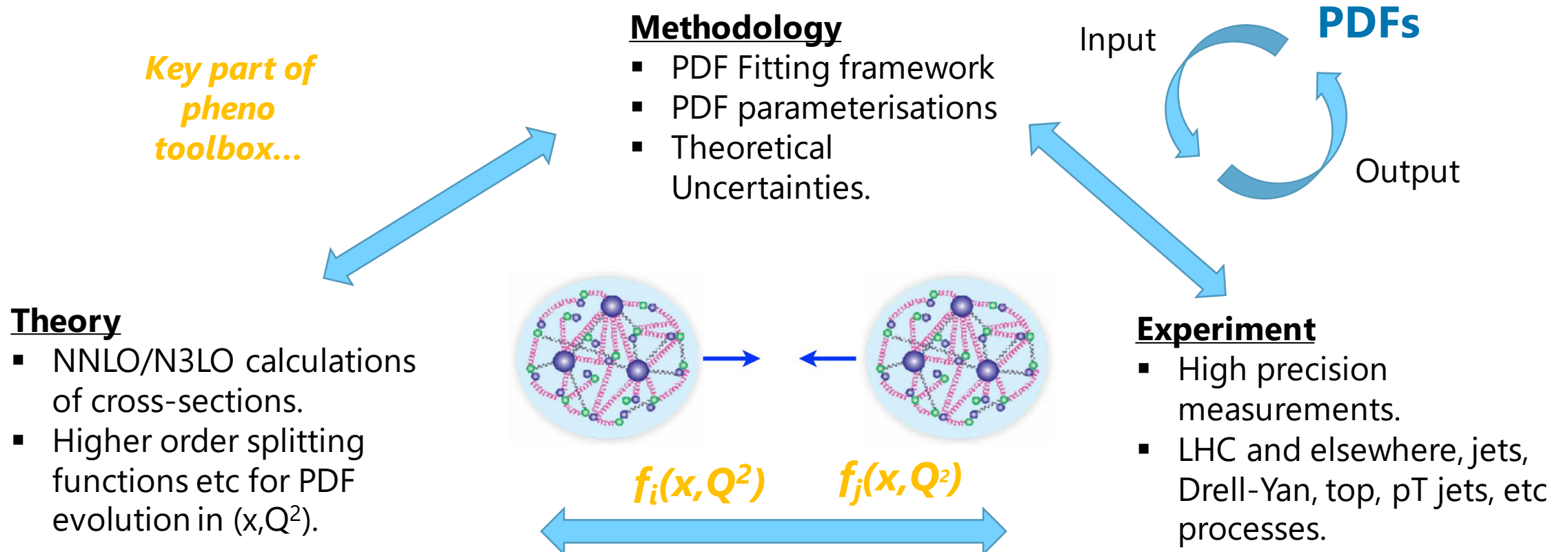
Cambridge:  
Undergrad, Master's,  
PhD 2010-2018



London:  
First Postdoc  
2018-2022



- Parton Distribution Functions (PDFs) describe momentum fraction ( $x$ ) and energy dependence ( $Q^2$ ) via Parton Distribution Functions -> PDFs:  $f(x, Q^2)$

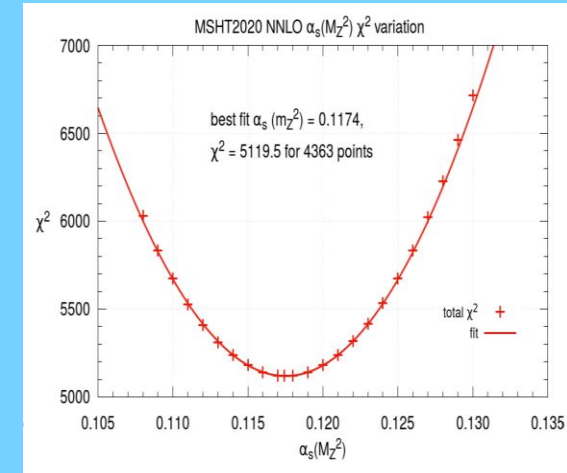
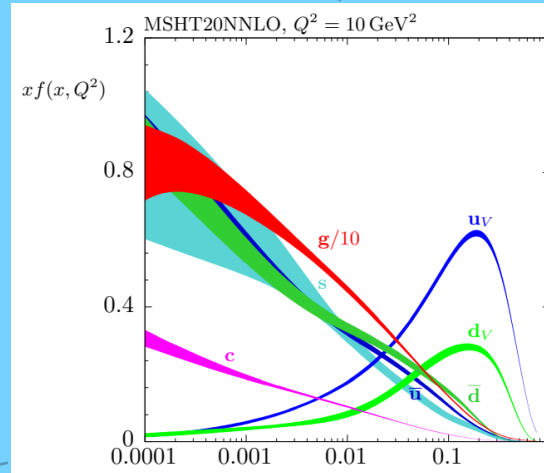
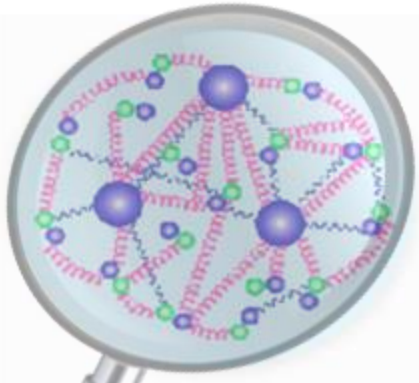




## Proton Structure – PDFs:

### Where do I come in?

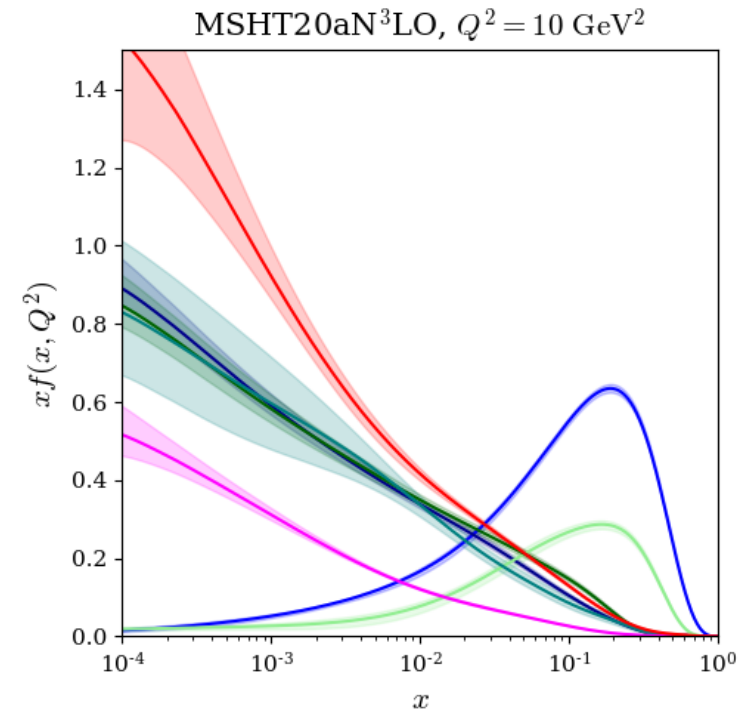
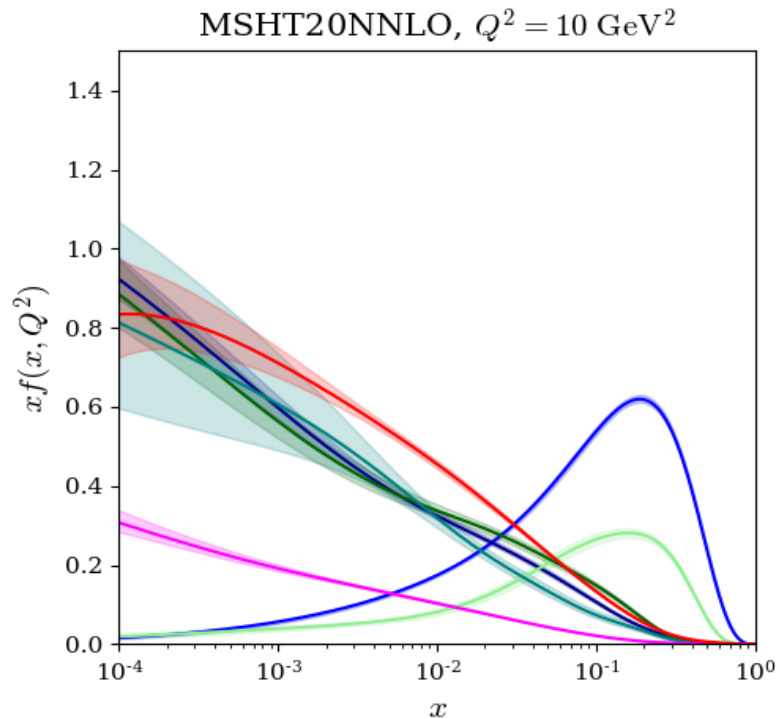
- Member of **MSHT** PDF group – MSHT20 set in wide use at the LHC and globally.
- Member of **PDF4LHC21** combination group of CT18', MSHT20, NNPDF3.1'.
- Recent work on first inclusion of *N3LO effects and theoretical uncertainties* – **MSHT20aN3LO** PDF set, publicly available for use!



# Proton Structure – PDFs:

## Favourite Plot:

- **aN3LO effects on PDFs** – significant in some regions, knock on effects on luminosities and cross-sections.
- Notable changes in the gluon and heavy flavour PDFs in particular...



*J. McGowan, TC, L.A. Harland-Lang, R.S. Thorne -  
Eur.Phys.J.C 83 (2023) 3, 185, arXiv:hep-ph/[2207.04739](https://arxiv.org/abs/2207.04739)*



# Thankyou!

# I look forward to meeting you all... ●