

# Donie O'Brien, Research interests

I am currently undertaking research towards a PhD in theoretical high energy spin physics. We are deriving relations which describe spin dependent (polarised) particle interactions. These relations are required by many laboratories that have experiments involving polarised beams and/or polarised targets.

Specifically, we work with the Polarised Antiproton eXperiments (PAX) collaboration in GSI Darmstadt. So far we have obtained results for polarised antiproton-electron and antiproton-proton scattering, these are the most urgently needed results for the PAX project.

We have begun to analyse spin dependent electron-deuteron and proton-deuteron scattering, and eventually plan to analyse polarised deuteron-Carbon scattering. These results are required by the RHIC Spin collaboration in BNL, New York.

The goal of this research area is a better understanding of the spin structure of nucleons (protons and neutrons). We also work on Form Factors and nuclear structure in general.

I often use computational techniques like *Mathematica* in my research and am interested in applications of computer science in mathematics and physics.

Previously while in DESY Zeuthen, I worked on electron-positron (Bhabha) scattering, and on theoretical predictions for the future linear collider. I like to keep up to date with the recent discoveries in this field, even though there is no expertise in my current institution.

I am fascinated by many areas of quantum field theory, and would like to learn as much QFT as possible during my PhD. Then, if necessary, I could branch into many areas of theoretical particle physics later in my career.

In my current institution (Trinity College Dublin) there is a very good group working on mathematical aspects of String Theory. I attend many of these seminars and group meetings. Thus I would like to be more familiar with the basics of String theory.