

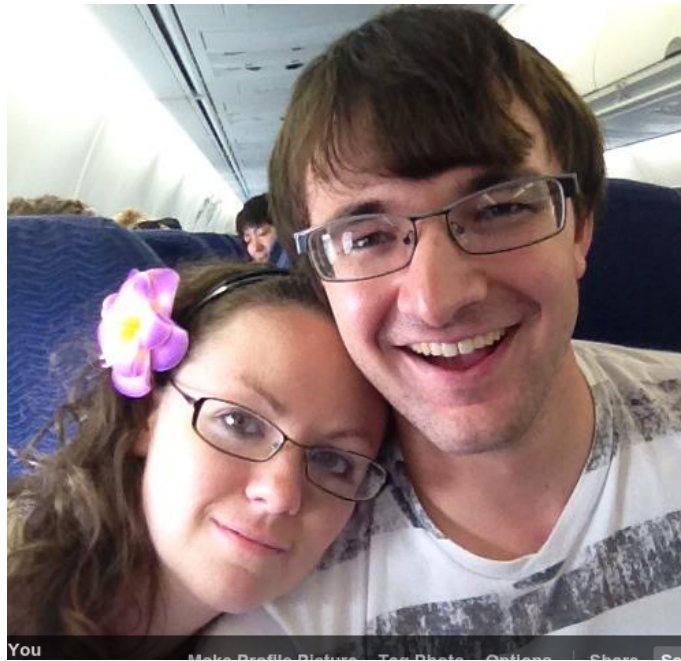
Daniel Jumper

Student Introduction

Spinfest 2015

Personal Info

From Dallas Texas



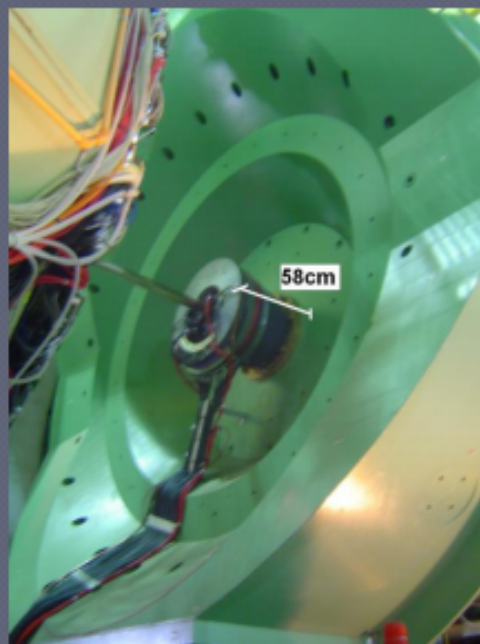
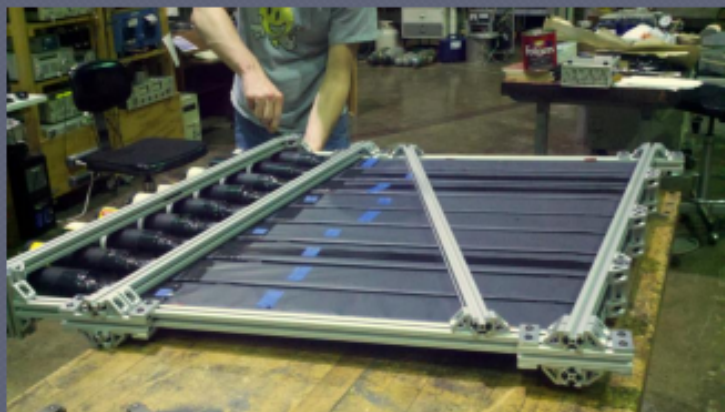
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Academic History

- Undergrad:
 - Abilene Christian University ('05-'09)
 - Worked on PHENIX summer '06, '07
- Grad School:
 - University of Illinois at Urbana-Champaign ('09-present)
 - Advisor: Matthias Grosse Perdekamp
 - Work:
 - Local UIUC RPC r&d
 - RPC assembly(St. 1) and operation (Run 13)
 - Run 13 $W \rightarrow \mu AL$ analysis

Slideshow!



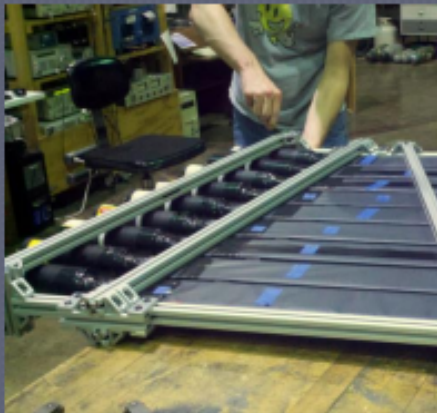
RPC 1
Before/After
Installation



RPC 3 "Efficiency"
Hodoscope



Slideshow!



Me in 2006

RPC 1
Before/After
Installation

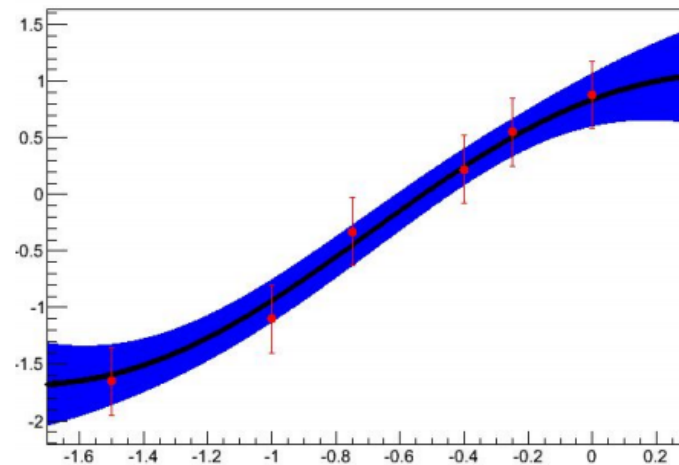
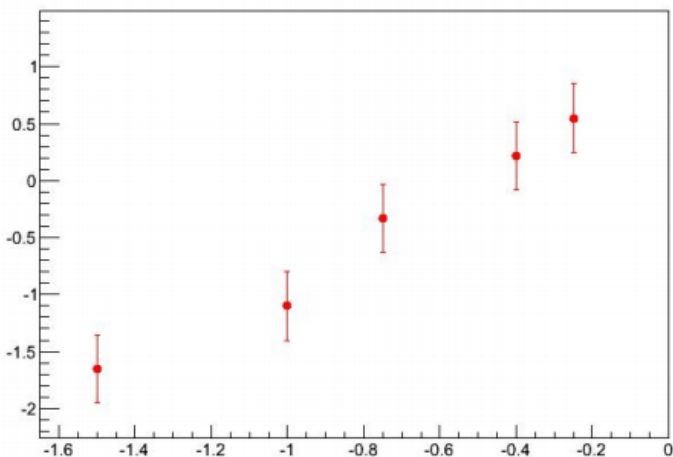


My Analysis - Run 13 $W \rightarrow \mu AL$

- Goal:
 - Better constrain separate quark and anti-quark contributions to longitudinal proton spin
- Channel:
 - $qq \rightarrow W^\pm \rightarrow \mu\nu\mu$ (at forward rapidity)
 - Weak interaction: parity violation Constrains possible quark helicities giving a simplified $AL \sim \Delta q$, Δq relation
- Mike's introduction had details on the rest!

Recent Focus - Gaussian Process Regression

- What is GPR?
 - Input: data points with uncertainty
 - Output: predicted data points with uncertainty
 - i.e. - interpolated + extrapolated distribution or “fit” distribution

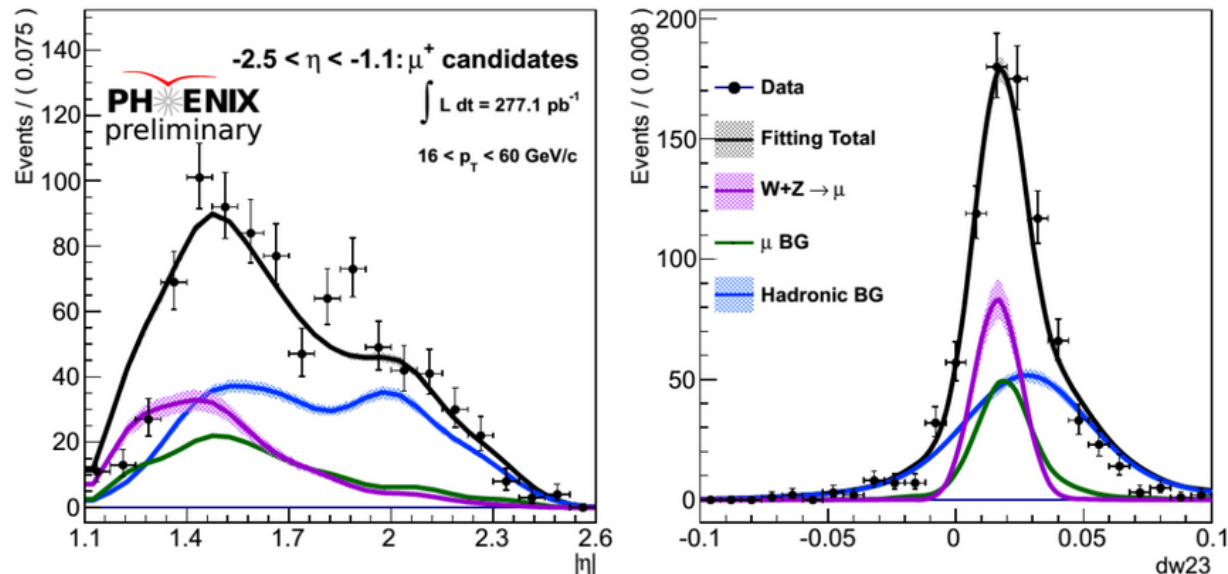


Recent Focus - Gaussian Process Regression

- Benefits:
 - Does not rely on functional form
 - does have some higher level underlying assumptions about the distribution
 - Produces uncertainties with the “fit” distribution
- Resources:
 - [PHENIX GPR Analysis Note](#)
 - [A nice basic paper on GPR](#)
 - [A more rigorous GPR explanation](#)
 - Python Packages:
 - [GPy](#) – has 2D functionality but harder to use
 - [sklearn.gaussian_process](#)

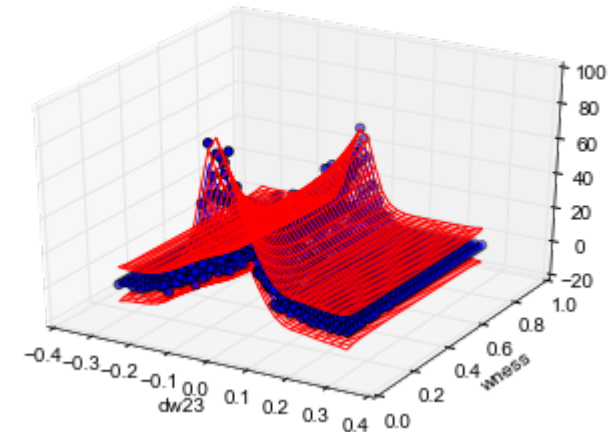
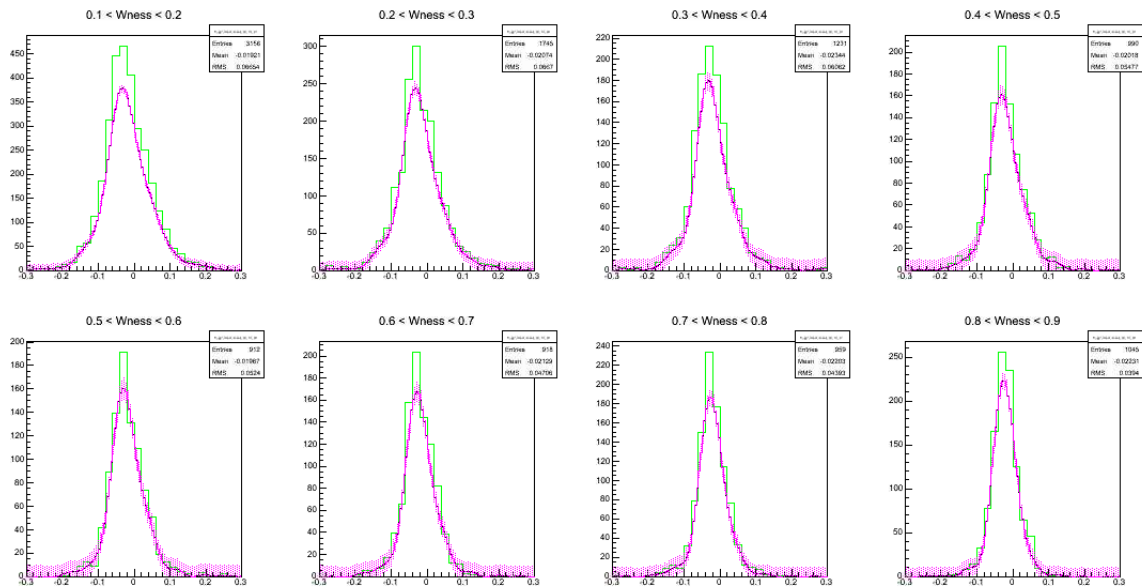
GPR in Run 13 W Analysis

- Important part of asymmetry calculation:
Signal/Background ratio calculation.
 - W to muon signal from simulation
 - muon backgrounds from simulation
 - hadronic background extrapolated from data



GPR in Run 13 W Analysis

- Important part of Signal/Background Extraction: Extrapolate “dw23” distribution to high “wness”



Don't forget the past!

- [Spinfest 2014 Talks \(indico\)](#)
 - Nice physics talks, student introductions, etc. separated by sessions
 - Check out the [computational tutorials](#) for useful computing skills and tips!
- [Spinfest 2013 Timetable \(indico\)](#)
 - also contains talks from 2013 (you have to browse the schedule manually though)
- [Spinfest 2012 Talks \(spinfest 2012 webpage\)](#)
 - user “spinfest”. our experiment
 - One particularly useful [practical talk on phenix analysis](#) from scott wolin