

## Curriculum Vitae

### Reinhard Schwienhorst

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#### University education

PhD - Physics, University of Minnesota, Minneapolis, Minnesota 2000  
Thesis Title: A New Upper Limit for the Tau-Neutrino Magnetic Moment  
Thesis Advisor: Professor Roger Rusack

Physik Diplom - Westfälische Wilhelms Universität Münster, Germany 1995  
Diplom Title: Elektron-Photon Korrelationen in der Elektronenstossionisation  
Diplom Advisor: Professor Karl Blum

#### Positions held

- Assistant Professor, Michigan State University, since August 2006
- Visiting Lecturer, Université de Provence, Aix-Marseille, June 2008
- Research Associate, Michigan State University, September 2000 until August 2005
- Research Associate, University of Minnesota, May 2000 until September 2000
- Research Assistant, University of Minnesota, June 1997 until May 2000
- Teaching Assistant, University of Minnesota, September 1995 until June 1997

#### Awards/Fellowships

- Thomas H. Osgood Memorial Faculty Teaching Award at MSU, 2008
- Tollestrup award for a postdoctoral research project, Fermilab, 2005
- Graduate School Fellowship, University of Minnesota, 1998
- Teaching Assistant recognition award, University of Minnesota, 1996

#### Research experience

I am currently involved in exploring the energy frontier, looking for new particles and the Higgs boson and studying the top quark with the ATLAS experiment at the LHC at CERN and the  $D\bar{0}$  experiment at the Fermilab Tevatron, as well as theoretical top quark studies. I was co-convenor of the  $D\bar{0}$  single top working group when we observed single top quark production for the first time.

As a graduate student I worked in the neutrino experiments MINOS and DONUT. We discovered the tau neutrino and I performed the most sensitive search to date for a tau neutrino magnetic moment.

#### Hadron collider physics

##### ATLAS, September 2006 – present

My primary physics focus on ATLAS is the study of electroweak top quark production. So far I have contributed to the CSC report on single top quark physics, which uses

simulated samples, as well as searches for single top production in early ATLAS data. The LHC has now started to collide beams, and we expect to measure electroweak production of single top quarks in the first year of data, followed by detailed studies of the interaction. In parallel, we are searching for hints of new physics in the form of a dilepton resonance.

### **DØ, September 2000 – present**

My primary physics focus at DØ has been the search for electroweak production of single top quarks. I have been leading this particular analysis group on DØ and also contributed to the general study of top quarks. During my second term as single top co-convenor from 2007 to 2009 we observed single top quark production for the first time, an important discovery that was widely publicized and took 20 years to achieve. Besides leading the group and working directly with the students and postdocs I was also responsible for the selection of discriminating variables and the statistical analysis. During my first term as co-convenor of the single top working group from 2003 to 2005 we laid the foundation for that measurement and published a cross section limit in Physics Letters B that was a factor of two better than all previous limits. I received the Tollestrup award at Fermilab for this effort.

I am expanding the single top effort to the low-mass Higgs final states. I am currently the Higgs low-mass analysis subgroup convenor, working closely with new MSU Faculty member Wade Fisher, who is the Higgs group convenor.

I have also served in various other convenership roles in DØ, as top triggers working group convenor and trigger board member from 2002 to 2003, trigger studies group convenor and trigger board member from 2005 until 2006. I have served and am currently serving on several other boards and committees on DØ, including analysis review boards and the authorship committee which decides who should be an author on physics papers published by the DØ collaboration.

### **Phenomenological studies at Michigan State, April 2004 – present**

In the spring of 2004 I started a collaboration with Professors C.-P. Yuan and R. Brock and two students in the phenomenological analysis of single top quark production at next-to-leading order in QCD. We are investigating the impact of QCD corrections to the production of single top quarks and their decay. Besides being directly involved in the physics analysis, I also guided the students and created the analysis software framework. I have co-authored three papers as a result of this work already and we are working on more.

### **Neutrino physics**

#### **DONUT, at the University of Minnesota, 1997 – 2000**

My thesis research was on the DONUT experiment at Fermilab. We were the first (and so far only) experiment to observe tau neutrino interactions directly. My thesis focused on the tau neutrino magnetic moment; searching for electromagnetic interactions of tau neutrinos in the DONUT detector. Besides my own analysis work, I contributed directly to many areas of the general tau neutrino analysis, for example creating a software framework based on Root to analyze and display tau neutrino interactions in nuclear emulsion.

As a member of DONUT, I wrote a paper on the tau neutrino magnetic moment search and contributed to several other publications, including the tau neutrino discovery paper.

### **MINOS, at the University of Minnesota, 1996-1997**

I spent the first year as a graduate student at the University of Minnesota on the MINOS experiment. While devoting most of my time to detector development work for MINOS, I also studied neutrino oscillations and investigated possible options to measure the neutrino magnetic moment using the Fermilab Main Injector neutrino beam.

### **Hardware experience**

As an experimental physicist I dedicate a significant fraction of my time to designing, building, and running experiments.

### **Commissioning the Level 2 Trigger System at DØ, 2000 – 2003**

I have spent most of my time during the first three years as a postdoctoral researcher at Michigan State University on hardware efforts aimed at preparing the DØ experiment to take data. I was responsible for completing the installation of the Level 2 trigger system, which is built from a combination of custom hardware interfaces and commodity computer components. I was involved in all aspects of the Level 2 trigger, overseeing the overall commissioning and integration effort, but also getting involved in smaller projects when necessary to ensure successful completion of the project. Once the trigger system was fully operational I lead the Level 2 trigger operations activities and coordinated the software.

### **Other DØ hardware experience**

- Chair of the L2 Beta production readiness review board in spring of 2005.
- Member of the DØ trigger rate task force. I have been a member of the DØ trigger rate task force since its inception in August of 2002. This group was charged with identifying trigger rate limitations and implement methods to remove them. I developed the tools used to identify the sources of rate limitations. I also coordinated and tested improvements to address the limitations.
- Shift Captain, detector shifter, and Level 2 trigger on-call expert.

### **CMS, at the University of Minnesota, May 2000 to September 2000:**

I worked on the initial design and modeling of a  $^{252}\text{Californium}$  neutron irradiation facility for CMS. I used the MCNP particle transport Monte Carlo program to model the shielding configuration for the source itself and calculated neutron fluence at various locations inside and around the shielding setup.

### **MINOS, at the University of Minnesota, 1995 – 1997**

I spent the first few years of my time as a graduate student on hardware projects for the MINOS experiment. I performed the initial studies for the active detector choice for the MINOS detector. At the University of Minnesota I characterized various photodetector and scintillator options considered for the MINOS detector, as well as a testbeam study.

### **CMS, at CERN, 1998**

I was resident at CERN in Geneva, Switzerland from June until September 1998. During that time I participated in the test beam study of calorimeter elements. I also contributed to several irradiation studies of photodetectors to be used in the CMS calorimeter readout.

## Teaching experience

2007 – present: Assistant Professor, Michigan State University

- Physics for Scientists & Engineers 2 (PHY 184), a large lecture class.
- Undergraduate Physics Laboratory I (PHY 251), a lab course for 350 students.
- Undergraduate Physics Laboratory II (PHY 252), a lab course for 350 students.
- Electronics (PHY 440), lectures and labs for about 30 juniors.

2000 – 2006: Research Associate, Michigan State University

- Supervision of graduate students working on single top quark physics as co-convenor of the single top quark analysis working group.
- Supervision of the trigger-related work by many students and postdocs at Fermilab as convenor of the Top Triggers working group at DØ.
- Supervision of Michigan State University graduate students.

1995 – 1997: Teaching Assistant, University of Minnesota

- Teaching assistant for a course on Methods of Experimental Physics.
- Teaching assistant for an introductory physics course for non-physics majors.

## Organizations

- American Physical Society (since 1996).
- American Association for the Advancement of Science (since 2005).

## Languages

- Fluent in German (mother tongue).
- Fluent in English.
- Basic knowledge of French.

## Personal

- Citizen of Germany.
- Permanent Resident in the United States of America.
- Born 1969.