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## Research Interests

I am excited by the potential for discovery in the interface between particle physics and cosmology, and would like to take advantage of this turning point in my life to pursue a career in that field.

## Education

- Ph. D. in Physics, Cornell University, expected December 2005  
(Courses included Quantum Field Theory, Cosmology, and an intense graduate lab.)
- B. S. in Physics with a minor in Mathematics, Carnegie Mellon University, May 1999

## Research Experience

- Research Assistant in the CLEO Collaboration Summer 2000 – present
- Di-electron Widths ( $\Gamma_{ee}$ ) of  $\Upsilon(1S)$ ,  $\Upsilon(2S)$ , and  $\Upsilon(3S)$  Advisor: Ritchie Patterson
  - Determined  $\Gamma_{ee}$  from inclusive  $\Upsilon$  cross-section measurements with 1.5% systematic uncertainties, and ratios of  $\Gamma_{ee}$  with 0.8% systematic uncertainties.
  - This level of accuracy required detailed understanding of the detector.
  - Planned and oversaw the acquisition of  $\Upsilon$  scan data (2001–02).
- Dark Matter Sensitivity Study for a Future Linear Collider
  - Participated in a small group to study Linear Collider sensitivity to a cosmologically-interesting mSUGRA model.
  - Simplified chargino to  $W^*$  LSP analysis and developed a method to fit  $W^*$  distributions for the LSP mass.
- Silicon Vertex Detector and Drift Chamber Alignment for CLEO-III
  - Investigated track-biasing effects in bhabhas, muon pairs, and cosmic rays, and numerically modelled my hypotheses of mechanical misalignments and distortions. (Many were resolved.)
  - Discovered a fine-angular scale effect in drift chamber tracking which is the limiting systematic in silicon alignment.
  - Developed tools for alignment which balanced automated optimization with human evaluation of residuals distributions.

- Optimized Inner Cylinder Thickness for CLEO-c Vertex Detector (ZD).
  - Measured stress-strain dependence of prototype aluminum tubes on wall thickness to balance mechanical strength against radiation opacity.
- Designed and built trigger and data acquisition system REU, Summer 1998 for a prototype Čerenkov detector.
  - Optimized photomultiplier base voltages, wrapped scintillator paddles, built a cosmic ray coincidence system, and finally built a trigger and data acquisition system using NIM electronics and an ADC/TDC card for the Macintosh.
  - Used this system to calibrate the Čerenkov detector’s response to high- $\beta$  muons.
  - Undergraduate research project at Jefferson Lab under Bogdan Wojtsekhowski

### Talks and Publications

- $\Gamma_{ee}$  of  $\Upsilon(1, 2, 3S)$  at Particles and Nuclei International Conference October 2005
- $\Gamma_{ee}$  of  $\Upsilon(1, 2, 3S)$  at Cargèse School of Physics and Cosmology August 2003
- $\Gamma_{ee}$  of  $\Upsilon(1, 2, 3S)$  at American Physical Society May 2002, May 2003
- DAQ for prototype Čerenkov detector at APS Poster Session May 1999
- Internal note on  $\Gamma_{ee}$  which will be the basis for a reviewed publication
- Internal note on what the  $\Upsilon$  lineshape scans teach us about storage ring parameters
- Internal note on alignment tools and how to apply them to the CLEO-c upgrade
- Co-authored internal note on CLEO-c vertex detector (ZD) design.

### Teaching Experience

- Supervised REU student working on spark chamber demonstration. Summer 2004
- Teaching Assistant, Cornell Physics Department Fall 1999 – Fall 2000
- Presented hour-long lectures for the Mathematics graduate student seminar and the Society of Physics Students on FRW Cosmology, Bell’s Inequality, Electromagnetic Gauge Freedom, the Higgs Mechanism, and Feynman Path Integrals.
- Guided innumerable tours of the CLEO detector and presented outreach talks to high school students and prospective graduate students.