

How can you connect different fields of study in order to innovate?

PHYSICS
UASCIENCE

HOME RESEARCH GRADUATE STUDIES UNDERGRADUATE STUDIES NEWS & EVENTS PEOPLE OUTREACH SUPPORT PHYSICS

Elliott Cheu

Professor of Physics
Associate Dean, College of Science

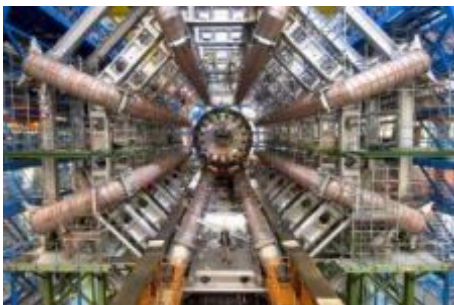
Address

University of Arizona
Department of Physics, PAS #81
1118 E. 4th Street
Tucson, AZ 85721

Phone: (520) 621-4274
FAX: (520) 621-4721
e-mail: echeu@email.arizona.edu
Office: PAS 460



Current Research



My current research interests involve searches for Supersymmetry and physics beyond the Standard Model. If we were to discover such decays, it would have a profound impact on understanding the origins of mass as well as problems such as Dark Matter. My research takes place primarily at the ATLAS detector, which is one of the experiments at the LHC (Large Hadron Collider).

I am also interested in the connection between cosmology and particle physics. I am participating in the Large Synoptic Survey Telescope (under construction at the University of Arizona) to better understand the underlying mechanisms of dark energy. Our efforts include construction of the LSST camera and studies to determine the limitations of the LSST dark energy measurements.

My previous interests revolved around the study of CP and CPT violation. CP violation was first discovered in 1964, yet its origins remain a mystery even today. In order to explain the predominance of matter over anti-matter in the universe, some level of CP violation is required. There are two forms of CP violation, indirect and direct. My work on the KTeV experiment involved the search for evidence of direct CP violation. In 1999 our experiment established the existence of direct CP violation.

Selected Publications

- The Mark III Vertex Chamber, J. Adler et al., Nuclear Instruments and Methods in Physics Research, A276, 42-81 (1989)
- Search for Neutrinoless Decays of the Tau Lepton, T. Bowcock et al., Physical Review, D41, 805-814 (1990)
- Measurement of the Inclusive B^* Cross Section above the Upsilon(4S), D. Akerib et al., Physical Review Letters, 67, 1692-1695 (1991)
- CPT Tests in the Neutral Kaon System, B. Schwingenheuer et al., Physical Review Letters, 74, 4376-4379 (1994)
- The KTeV Hardware Cluster Counter, C. Bown, E. Cheu, J. Dusatko, H. Sanders, M. Zeleznik. Nuclear Instruments and Methods in Physics, A369, 248-254 (1996)
- Observation of Direct CP Violation in $K\{S,L\} \rightarrow \pi\pi$ Decays, A. Alavi-Harati et al., Physical Review Letters, 83, 22-32 (1999)
- Measurements of Direct CP Violation, CPT Symmetry, and Other Parameters in the Neutral Kaon System, A. Alavi-Harati et al., Physical Review, D67, 012005 (2003)
- Measurement of the Decay $KL \rightarrow \pi^0 e^+ e^- \gamma$, E. Abouzaid et al., Physical Review, D76, 052001 (2007)
- Search for $B(s) \rightarrow \mu^+ \mu^-$ at D0, V. M. Abazov et al., Physical Review, D76, 092001 (2007)

- Final Results from the KTeV Experiment on the Decay $K(L) \rightarrow \pi^0 \gamma \gamma$, E. Abouzaid et al., Physical Review, D77, 112004 (2008)
- A combined search for the standard model Higgs boson at $\sqrt{s}=1.96$ TeV, V. M. Abazov et al., Physics Letters, B663, 26 (2008)
- Cathode strip chambers in ATLAS: Installation, commissioning and in situ performance, T. Argyropoulos et al., IEEE Trans. Nucl.Sci., 56, 1568 (2009)
- Precise Measurements of Direct CP Violation, CPT Symmetry, and Other Parameters in the Neutral Kaon System, E. Abouzaid et al., Physical Review, D83, 092001 (2011)
- Search for supersymmetry in events with three leptons and missing transverse momentum in $\sqrt{s} = 7$ TeV pp collisions with the ATLAS detector, G. Aad et al., Phys. Rev. Lett., 108, 261804 (2012)
- Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC, G. Aad et al., Phys. Lett., B716, 1-29 (2012)

Teaching

- Fall 2012 - PHYS 261H: Honors Introductory Electricity and Magnetism
- Fall 2011 - PHYS 105A: Introduction to Scientific Computing
- Fall 2010 - PHYS 105A: Introduction to Scientific Computing
- Fall 2010 - HNRS 195I: Special Topics in Science
- Fall 2009 - PHYS 331: Electricity and Magnetism I
- Fall 2009 - PHYS 241: Introduction to Electricity and Magnetism

Outreach Activities

- "[From the Big Bang to Dark Matter: Turning on the Large Hadron Collider](#)" (220 MB), September 10, 2008. A public lecture to celebrate the start up of the Large Hadron Collider.
- "[Unlocking the Mystery of Matter](#)" (233 MB), February 3, 2009. College of Science Lecture Series on large-scale projects that have the potential to reshape our understanding of the Universe and ourselves.
- "[What's the Matter with Matter: How the Universe Lost Its Antimatter and Why It Became So Dark](#)" (311 MB), March 10, 2010. Blitzer Award Lecture.
- "[Large Hadron Collider: Atom Smasher to reveal mysteries of the Universe](#)" (46 MB), March 15, 2010. KUAT Wavelengths Television Program

Related Links

- [Physics Department Home Page](#)
- [Elementary Particle Physics](#)
- [ATLAS Experiment](#)
- [Large Synoptic Survey Telescope](#)

