



AMHERST CENTER FOR FUNDAMENTAL INTERACTIONS

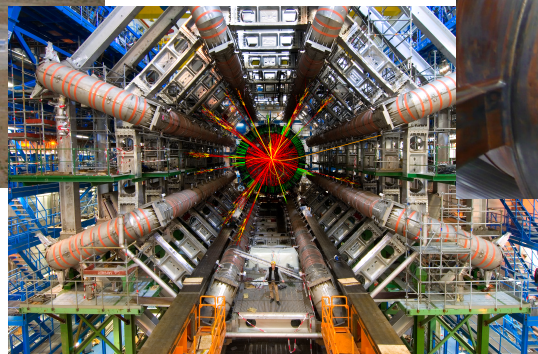
Physics at the interface: Energy, Intensity, and Cosmic frontiers

University of Massachusetts Amherst

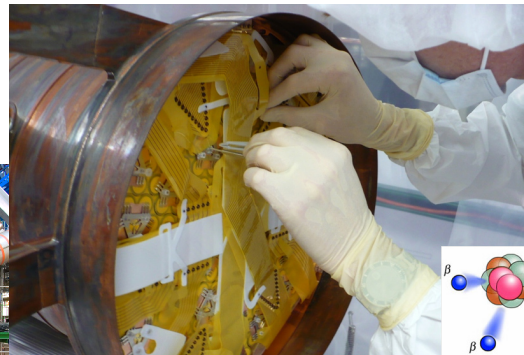
Welcome to the ACFI !



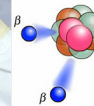
LIGO



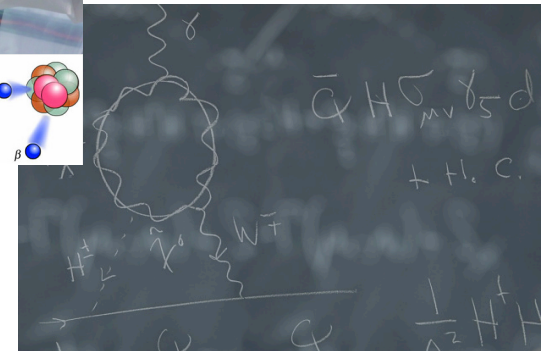
ATLAS



EXO



Theory





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We seek answers to key open questions about nature's fundamental interactions, such as:

Why is there more matter than anti-matter in the Universe?

What additional forces were active during the first moments after the Big Bang?

How are protons and neutrons put together?

Our mission:

Advancing research in theoretical and experimental physics at the interface of the Energy, Intensity, and Cosmic frontiers.

<http://www.physics.umass.edu/acfi/>



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Activities

- **Core Research:** *ATLAS, EXO, J Lab parity & chiral, LIGO, RHIC Spin, Borexino, Theory*
- **Targeted Workshops:** *Hadronic Probes, Lambda & Quasi Lambda, Higgs Portal,...*
- **Visiting Researchers:** *Ph.D. students (Australia, China), post-docs, faculty & senior researchers*



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Past Workshops

Hadronic Probes of Fundamental Symmetries

Joint ACFI-Jefferson Lab Workshop

March 6-8, 2014

U Mass Amherst



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Past Workshops

Lambda and Quasi-Lambda

ACFI Workshop

April 10-12, 2014

U Mass Amherst



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Upcoming Workshops

Unlocking the Higgs Portal

ACFI Workshop

May 1-3, 2014
U Mass Amherst



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Upcoming Workshops

Measuring the Neutron Lifetime

ACFI Workshop

September 19-21 , 2014

U Mass Amherst



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Upcoming Workshops

Fundamental Symmetry Tests with Rare Isotopes

ACFI Workshop

October 23-25, 2014

U Mass Amherst



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Workshops Logistics

- **Wireless Network: UMASS (usr & pw in packet)**
- **Lunches on Campus: Campus Center or Worcester Dining Commons (~ 5 minutes walk)**
- **Dinners: Thursday Workshop Dinner @ Monkey Bar Bistro, Friday in Amherst Center**
- **Schedule**
- **People: students, post-docs, staff**



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Higgs Portal: Scientific Questions

- *What are the well-motivated Higgs portal scenarios most relevant to dark matter and /or the electroweak phase transition?*
- *What are their LHC signatures?*
- *Can these signatures be observed or excluded in cosmologically interesting regions of parameter space and, if so, what is the required LHC luminosity?*
- *For which scenarios and regions of parameter space would discovery or exclusion require an e^+e^- collider OR 100 TeV pp collider ?*