

## Calendar

### [Have a safe day!](#)

**Wednesday, Nov. 3**

**12:30 p.m.**

Physics for Everyone -  
Auditorium

Speaker: Brenna Flaughner

Title: What the Cosmos  
Can Tell Us

**3:30 p.m.**

DIRECTOR'S COFFEE  
BREAK - 2nd Flr X-Over  
THERE WILL BE NO  
FERMILAB COLLOQUIUM  
TODAY

**Thursday, Nov. 4**

**9:45 a.m.**

[Presentations to the  
Physics Advisory  
Committee](#) - Curia II

**2:30 p.m.**

[Theoretical Physics  
Seminar](#) (NOTE

LOCATION) 1 West

Speaker: Clifford Cheung,  
University of California,  
Berkeley

Title: Signs of a Hidden  
Sector from

Supersymmetry(s)

**3:30 p.m.**

DIRECTOR'S COFFEE  
BREAK - 2nd Flr X-Over

**4 p.m.**

[Accelerator Physics and  
Technology Seminar](#) - One

West

Speaker: Diktys Stratakis,  
University of California, Los  
Angeles

Title: Triggers and  
Mitigation Strategies of rf

Breakdown For Muon  
Accelerator Cavities

Click here for [NALCAL](#),  
a weekly calendar with  
links to additional  
information.

[Upcoming conferences](#)

## Special Announcement

### Physics for Everyone: Today at 12:30 p.m. in auditorium



M78 nebula. Come to the next Physics for Everyone lecture, "What the cosmos can tell us" today. Credit: Sloan Digital Sky Survey

Probing the cosmos for secrets to some of the universe's greatest mysteries is all in a day's work for some Fermilab scientists.

Come to the next installment of the Physics for Everyone lecture series, "What the cosmos can tell us," to learn more about dark matter and dark energy as well as how and why Fermilab scientists are seeking to understand these concepts.

Fermilab scientist Brenna Flaughner will talk about experiments and projects at the Cosmic Frontier, what they're looking for, why and what we can learn from astrophysics.

"What the cosmos can tell us" will take place from 12:30 to 1:30 p.m. today in Ramsey Auditorium. There will be time for questions and answers. The lecture is part of a non-technical series about Fermilab science and culture. A video of the first lecture by scientist Herman White is [now available online](#).

## Experiment Profile

### COUPP

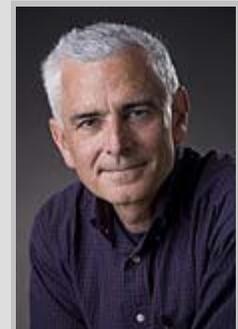
**Editor's note:** The COUPP experiment just began [taking data](#) with their 4-

## From Center for Particle Astrophysics

### Has dark matter been detected?

*Craig Hogan, director of the Center for Particle Astrophysics, wrote this week's column.*

We have been on the hunt for dark matter for a long time. It's an elusive quarry. Many different lines of evidence, based on gravitational interactions of galaxy-size swarms of matter, indicate that most of the universe is made of



Craig Hogan

a new kind of nearly noninteracting, relatively slow-moving particle. But experiments so far have found neither signals of individual dark matter particles nor any data that hint at even the most basic properties of those particles, such as their mass.

That's why a lot of people are talking about a [paper](#) submitted recently by Dan Hooper, a Fermilab theorist, with a graduate student, Lisa Goodenough. They analyzed data from the Fermi Gamma-ray Space Telescope and found evidence for an unusual source of gamma rays near the center of our galaxy, the Milky Way.

The spectrum of this source is unusual: Most of its power is concentrated in a band of energy between 2 and 4 GeV, unlike the more spread-out power-law spectrum characteristic of astrophysical gamma-ray emission. And although the source is concentrated near the center of our galaxy, it's not a point, but is spread out across about a degree in the sky.

Remarkably, this is just what we expect if dark matter particles that make up most of the Milky Way's mass have a mass of about 7 GeV, and come in matter and antimatter versions that occasionally

## Campaigns

[Take Five](#)

[Tune It Up](#)

## Weather



**Partly Sunny**  
55°/37°

[Extended Forecast](#)  
[Weather at Fermilab](#)

## Current Security Status

[Secou Level 3](#)

## Wilson Hall Cafe

### Wednesday, Nov. 3

- Breakfast: English muffin sandwich
- Portobello harvest grain
- Santa Fe chicken quesadilla
- Hoisin chicken
- \*Parmesan fish
- Cuban panini
- Assorted sliced pizza
- Shrimp pesto

[Wilson Hall Cafe Menu](#)

## Chez Leon

### Wednesday, Nov. 3

#### Lunch

- Northern Italian lasagna
- Caesar salad
- Cassata

### Thursday, Nov. 4

#### Dinner

- Mixed greens w/ pecans, goat cheese & dried cranberries
- Lamb chops w/ herb & olive crust
- Garlic mashed potatoes
- Sautéed tri-colored peppers
- Pear tart

[Chez Leon Menu](#)



Fermilab scientist Mike Crisler examines the COUPP bubble chamber.

*kilogram bubble chamber, located at SNOLab.*

#### NAME:

Chicagoland Observatory for Underground Particle Physics, or COUPP

#### WHAT WILL THIS TELL US?

Everything you see, visible matter, makes up 4 percent of the universe. Dark matter and dark energy make up the rest of the universe. Physicists understand that dark matter acts as an invisible source of gravity, but little more.

#### WHY IS THIS EXPERIMENT NEEDED

**NOW?** Physicists have narrowed the hunt for what particles constitute dark matter to those that are heavy, neutral and interact very weakly with other matter particles. Only this type of particle fits with the way the universe evolved and its matter density.

#### WHAT IS COUPP LOOKING FOR? A

nuclear recoil from a dark matter particle striking a nucleus of an atom in a liquid molecule. That triggers the evaporation of a small amount of liquid, which causes a bubble to start growing. The correct type of bubble would point to the existence of a leading candidate for dark matter called Weakly Interacting Massive Particles, or WIMPs.

**FUNDED BY:** DOE and NSF

**NUMBER OF COLLABORATORS:** 20

**U.S. COLLABORATING INSTITUTIONS:**

Two universities, one national laboratory

**NON-US COLLABORATING**

**INSTITUTIONS:** One national laboratory in Canada

**HOW DOES THIS FIT INTO FERMILAB'S**

**STRATEGIC PLAN?** Fermilab scientists search for dark matter WIMPs using four different technologies: bubble chambers (COUPP), cryogenic crystals (CDMS), liquid argon (Darkside) and Charge Coupled Devices (DAMIC).

**STATUS:** COUPP started in 2004. A 4-

annihilate. They destroy each other and convert by various channels into observable gamma rays. In other words, our galaxy's halo may not be dark after all, but very faintly glowing. The glow is brightest near our galaxy's center because that's where the dark matter particles are closest together and collide with each other most easily.

It's tantalizing that the same dark matter particle mass can also explain data from two underground experiments known by their acronyms, DAMA and CoGeNT. Some of their signals may have been caused by direct collisions of dark matter particles with atomic nuclei in the laboratory.

Could this finally be the long-awaited detection of dark matter? Maybe, but we won't know for a while yet. Physicists will analyze Fermi's gamma-ray signal in more detail to see if it is really consistent with dark matter annihilating, or whether there is evidence for a less exotic, unfamiliar astrophysical process involving only already-known particles. Physicists also will re-examine underground experiments in new ways and in some cases perhaps even reconfigure them to operate with greater sensitivity to the mass range of about 7 GeV, a considerably lower mass region than most experiments have focused on up to now.

New developments may unfold quickly, even over the course of the next months, so it will be an exciting time. At Fermilab, we'll work hard to disprove the Hooper/Goodenough claim--- because that's also the best way to convince ourselves that it might be true.

## Special Announcement

### “Ethics in Science” seminar at University of Chicago

Fermilab scientists and researchers are invited to attend the “[Ethics in Science](#)” reception and panel discussion on Wednesday, Nov. 10, at Frank Lloyd Wright's Unity Temple in Oak Park.

RSVP through the [website](#). The deadline to RSVP is today.

Call x3524 to make your reservation.

## Archives

[Fermilab Today](#)

[Director's Corner](#)

[Result of the Week](#)

[Safety Tip of the Week](#)

[CMS Result of the Month](#)

[User University Profiles](#)

[ILC NewsLine](#)

## Info

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kilogram bubble chamber was installed at SNOLAB in September 2010. A second 60–kg chamber will follow in late 2010.

**LIFESPAN OF EXPERIMENT:** The deployment of a 500 kg chamber in a deep underground site is expected in 2013. It will operate for a number of years.

**PHYSICS FRONTIER EXPLORING:**  
Cosmic Frontier

[Read more](#)

## Photos of the Day

### Graduate Student Association annual Halloween party



The Drug Sniffing Dogs performed at Kuhn Barn Oct. 29 during the Graduate Student Association Halloween party.



A group of friends stopped dancing for a photo at the GSA annual Halloween party on Oct. 29.

## In the News

### Antarctic balloon sees particles with a million times more energy than the Large Hadron Collider

From *The Guardian*, Oct. 30, 2010

The ANITA experiment is designed to look for neutrinos, but saw 16 ultra-high-energy cosmic rays by mistake.

Ryan Nichol, who works upstairs from me at UCL, gets together with NASA every now and then and flies a balloon around

The event is the second in a series of Joint Speaker events hosted by the University, Argonne and Fermilab. The panel will include four distinguished panelists and moderator William Schweiker, director of the Martin Marty Center and Edward L. Ryerson, distinguished service professor of Theological Ethics in the Divinity School.

## Safety Update

### ES&H weekly report, Nov. 2

This week's safety report, compiled by the Fermilab ES&H section, includes one recordable incident. Find the full report [here](#).

[Safety report archive](#)

## Announcements

### Latest Announcements

[Muscle toning begins Nov. 9](#)

[Russian club kick-off meeting](#)

[FNPR service upgrade - Nov. 4](#)

[Stampers club](#)

[Computer security awareness day - Nov. 9](#)

[Annual enrollment](#)

[Free weekly wellness classes](#)

[Martial arts classes](#)

[Free CERN LHC book](#)

[Nov. 22 deadline for The University of Chicago Tuition remission program](#)

[Toastmasters - Nov. 4](#)

[Argentine Tango through today](#)

[Pedestrian safety awareness for families](#)

[Pedestrian safety at crosswalks](#)

[ES&H winter fair - Nov. 10](#)

[Bullying: It's everyone's problem - Nov. 18](#)

[Accelerate to a Healthy Lifestyle program](#)

[Chicago Blackhawks November discount tickets](#)

[Needles and Threads introductory](#)

the Antarctic.

They are looking for the answer to one of the great questions in astrophysics. We know that there are really really high energy particles hitting the Earth all the time from outer space. We would really like to know where they are coming from. The aim of ANITA (Antarctic Impulsive Transient Antenna) is to address this by looking for neutrinos.

[Read More](#)

[meeting schedule](#)

[Submit an announcement](#)