

Leading physicist lectures on advances in superconductivity

By SEMELE HALKEDIS
Collegian Science Writer

Electric cars, controlled fusion, ultra-sensitive optical devices, and power generators are just a few of the potential applications of high-temperature superconductive materials, said Paul Chu, a leading physicist in the field of superconductivity last night.

Over 350 people crammed into 119 Osmond to hear Chu give the 1988 Mueller Lecture in physics, titled "High-Temperature Superconductivity — Past, Present, and Future!"

Chu began by explaining the basic properties of superconductors. He said superconductors conduct electricity with no electrical resistance and cannot be penetrated by magnetic fields.

In order for a material to act as a superconductor, Chu said three barriers must be overcome — the transition temperature, the critical current density, and the critical magnetic field. Going beyond any of these critical points will cause a material to stop acting as a superconductor.

Chu said when superconductivity was first discovered about 75 years ago, materials had to be cooled to a temperature of four Kelvin, or about 277 degrees Celsius below zero, in order to act as superconductors.

Because these materials required

such low temperatures to be superconductive, they had to be cooled by liquid helium, which is rare, expensive, and difficult to work with, Chu said.

As research continued, materials which acted as superconductors at higher temperatures and could be cooled with liquid hydrogen were discovered, and in 1986 a high-temperature copper oxide superconductor was discovered.

Chu said he and his colleagues soon identified the material, which soon became known as the "one-two-three compound." The compound acts as a superconductor at temperatures around 90 Kelvin.

These results were presented at the American Physical Society's annual meeting in March 1987, creating a historic occasion that was called the "Woodstock of Physics," Chu said.

Chu said much work is still being done using the oxide superconductors in an attempt to find even higher temperature superconductors.

Superconductive compounds have many potential applications, he said.

On a small scale, superconductors could be used in the form of a thin film — with ultra-fast devices and in radar detectors, for example. These applications could be implemented in three to five years, Chu said.

On a large scale, in bulk form or wire, superconductors could be used



Collegian Photo / Lydia Kasparian

Paul Chu

in motors, power generators, power storage, electric cars, or controlled fusion, he said. These methods could be applied in 10 years, he speculated.

However, all of the applications which have been considered for superconductors were based on conventional superconductors, not the recently discovered oxide superconductive materials. One possible application for these materials would be an ultra-sensitive optical device.

Chu said one thing often overlooked is the use of these materials in a non-superconductive application. These applications could include chemical batteries, and smoke detectors.

Movin' On features many performers

A crowd of 10,000 is expected to visit the HUB lawn tomorrow to hear the live bands performing at Movin' On, the annual free concert sponsored by the Association of Residence Hall Students in cooperation with WWZU-FM.

Calling the event "an all-around musical day," publicity chairman Stevie Rocco said the movie *Dirty Dancing* will be shown following the last band's performance around 10:30 p.m.

The eight bands scheduled to play are:

- Earthtones.....11:30 a.m.
- Split Decision.....12:45 p.m.
- 11th Hour.....2:15 p.m.
- Affordable Floors.....3:15 p.m.
- Night Shift.....4:15 p.m.
- Tom Larsen Band.....5:30 p.m.
- They Might Be Giants.....7:30 p.m.
- Bricklin.....8:15 p.m.

T-shirts will be sold for \$5 today at a table in the HUB basement and on Saturday during the concert. Rocco said. Buttons will also be sold for 50 cents.

Marshalls will be on duty to police the area, check for alcohol and pick

■ Please see a story on the bands. — Page 26

up trash at the concert. Rocco said more volunteers are still needed and would have to work a two-hour shift during the day and get a free T-shirt.

Anyone interested in being a marshal during the concert can still get involved today by calling either the ARHS office at 863-2747 or leave a message at 862-6321.

— by Maryann Liddy

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