Dartmouth Online
Edition of America's oldest college newspaper.

Friday, January 10, 2003

Chaboyer study: dark energy drives universe

by Samantha Lane

Just when it looked like **cosmologists had a firm grasp** on the fundamental laws of the **universe, it turns out** that they know far less about its **workings than** previously thought.

Confirming earlier findings that the **universe has the ability to** expand indefinitely, Physics and Astronomy **Professor** Brian Chaboyer recently found that the **universe is composed** of a mysterious form of negative pressure **energy** -- dubbed "dark energy" -- that scientists have never **been able to directly** observe.

Because dark energy is too dificult to **view in a laboratory,** scientists can only infer its presence **based on how it has** influenced the expansion of the universe.

Chaboyer and his collaborator Lawrence Krauss, a physics and astronomy professor at Case Western **Reserve University,** published their findings in the Jan. 3, 2003, issue of Science magazine.

Today's News

Swimmers react with joy and tears

Panhell, IFC kick off winter rush

Sen. Kerry to speak at Rocky

N.H. law doubles fine for fake ID possession

Pavillion popularity triples in the past year

Chaboyer study: dark energy drives universe

Other Related Links

Articles by Samantha Lane

Their report, keeping with the widely accepted belief in the Big Bang Theory -- the prevailing theory about the origin and evolution of our universe -- confirmed more recent theories that the universe not only continues to expand but is accelerating in its expansion.

Chaboyer is the first to admit that when the original theories were published four years ago he was "among the many skeptics" who doubted the existence of such an intangible form of energy.

In fact, he came to his current findings unintentionally while studying the age of large groupings of stars called globular clusters that are found on the outskirts of the Milky Way.

He found that the clusters are about 12 billion years old, far older than a universe that is not accelerating. A static universe would be no older than about nine billion years.
The evolution of the universe is determined by a struggle between two opposing forces: momentum of expansion and the pull of gravity. In order for the expansion of the universe to be accelerating, gravity must be working with momentum rather than against it. Because scientists know that the strength of the pull of gravity depends on the density and pressure of the matter in the universe, they can deduce that in order for its expansion to accelerate it must be composed of negative pressure energy -- Chaboyer's dark energy.

"The existence of dark energy has really revolutionized the fields of physics and astronomy," Chaboyer said, noting that six years ago no one believed in dark energy, while today scientists are racing to learn as much about it as they can.

But with an acceptance of dark energy's existence come a host of new questions.

"What is the exact nature and composition or dark energy? How can negative energy exist in the vacuum we once believed outer space to be? Is dark energy a constant or does it change over time?" Answering these questions, Chayboyer says, would reveal worlds of information about fundamental physics and the nature of the universe.

Given his recent findings, Chaboyer now recognizes that the universe is "a much stranger place than we'd thought" and finds the "idea that the universe is dominated by something we've never seen ... pretty remarkable."