

# West Michigan Skies

GRAND RAPIDS

## Dark energy is out there, and it won't be stopped

By David L. DeBruyn  
grnews@mlive.com

Dragan Huterer exudes enthusiasm about his research. After all, he and colleagues at the University of Michigan are investigating one of the most significant of nature's mysteries: What is the source of "dark energy" that could make up more than two-thirds of the universe?

Since introduction of the concept in 1998, observations and scientific thinking have converged to support its existence.



Huterer

Huterer and teams of physicists and graduate students from U-M and other universities use images of distant galaxies and exploding stars (supernovas) within them taken by the Hubble Space Telescope and ground-based instruments to formulate theories about dark energy. These theories could help explain why the universe is accelerating, essentially growing larger at an ever faster rate.

### QUITE A STORY

Huterer brings the fascinating story of the accelerating universe, and the dark energy that could propel it, to Grand Rapids this week during a public presentation Thursday evening.

A native of what then was Yugoslavia — and a self-professed physics geek since his high school

### IF YOU GO

#### DEEP PHYSICS

**What:** Physics lecture for the general public  
**Who:** Dragan Huterer, associate professor of physics at the University of Michigan  
**Topic:** "Dark Energy and the Accelerating Universe"  
**When:** 7 p.m. Thursday  
**Where:** Schuler Books and Music, 2660 28th St. SE, Grand Rapids  
**Admission:** Free  
**Sponsored By:** Grand Rapids Amateur Astronomical Association and Grand Rapids Public Museum

years — Huterer got hooked by an article on cosmic inflation by proponent Alan Guth in a popular science magazine. Huterer decided to pursue cosmology, a study of the origin and dynamics of the universe.

Of special interest is what happened just after the "big bang," the event scientists believe started the expansion of the universe about 13 billion years ago.

Huterer emigrated to the United States in 1992, just after civil war broke out in his homeland (now Bosnia). At the Massachusetts Institute of Technology, he took a cosmology course taught by Guth himself.

Huterer went on to do graduate work at the University of Chicago, where he considered Michael Turner (who introduced the term "dark energy") and Wayne Hu his principal mentors. He did postgraduate work



This image of galaxy cluster MACS 1206 is part of a broad survey with NASA's Hubble Space Telescope. The distorted shapes in the cluster are distant galaxies from which the light is bent by the gravitational pull of an invisible material called dark matter within the cluster of galaxies. (NASA photo)

at Case Western Reserve University in Cleveland before coming to Michigan in 2007.

### PERPETUAL EXPANSION

Introduction of the concept of dark energy brought about the prediction that galaxies would rush apart from one another forever. There followed mounting observational evidence they are doing so at an accelerating rate.

Gravitational forces attracting galaxies toward one another appear insufficient to overcome the forces of dark energy pulling them apart. Therefore, in the view of Huterer and

most fellow cosmologists, theories that the universe might one day collapse are no longer valid.

During a recent phone conversation, Huterer brimmed with excitement about what he and his team are working on now.

"More is unknown about dark energy than what is known," he told me. "That is what makes it such a fascinating subject of investigation."

One point really struck me: What we actually see with the naked eye and through powerful telescopes — all of the known planets, stars and galaxies — comprises less than one-

half of 1 percent of everything that is out there! Close to 20 percent is enigmatic "dark matter," which scientists know is there by its gravitational signature but cannot see, and the rest is dark energy.

Huterer said early evidence of dark energy's existence left some ambiguity when first theorized in 1998, but, "So much has been discovered since."

### TAKING THE LEAD

He has assumed a leadership role in the investigation of the role of dark energy in the earliest moments of the universe's evolution.

West Michigan native Jacob Bourjaily, himself a young physicist at the Niels Bohr Institute in Copenhagen, said that by what he terms "almost absurd coincidence," he kept running into Huterer at science conferences throughout the world. Because of shared scientific interests, they keep in touch.

In a recent email, Bourjaily spoke highly of his fellow scientist and friend.

"He is extremely well respected, and a world-renowned authority on the investigation of dark energy and its influences on our visible universe," Bourjaily said. "And, he is exceptionally talented at communicating this exciting area of research to the public."

Huterer said while results from a wide variety of experiments now have converged to support its existence, dark energy remains "one of the foremost mysteries of modern physics."

"We are looking for any departure from the prevailing model of what it is," he said. "If we see a departure, we will have further information about the nature of dark energy."

I suspect Huterer will continue to be an important member of a team seeking just that, and I am looking forward to his upcoming Grand Rapids presentation.

— David L. DeBruyn  
is curator emeritus of the Roger B. Chaffee Planetarium at the Grand Rapids Public Museum.