



# After Dark

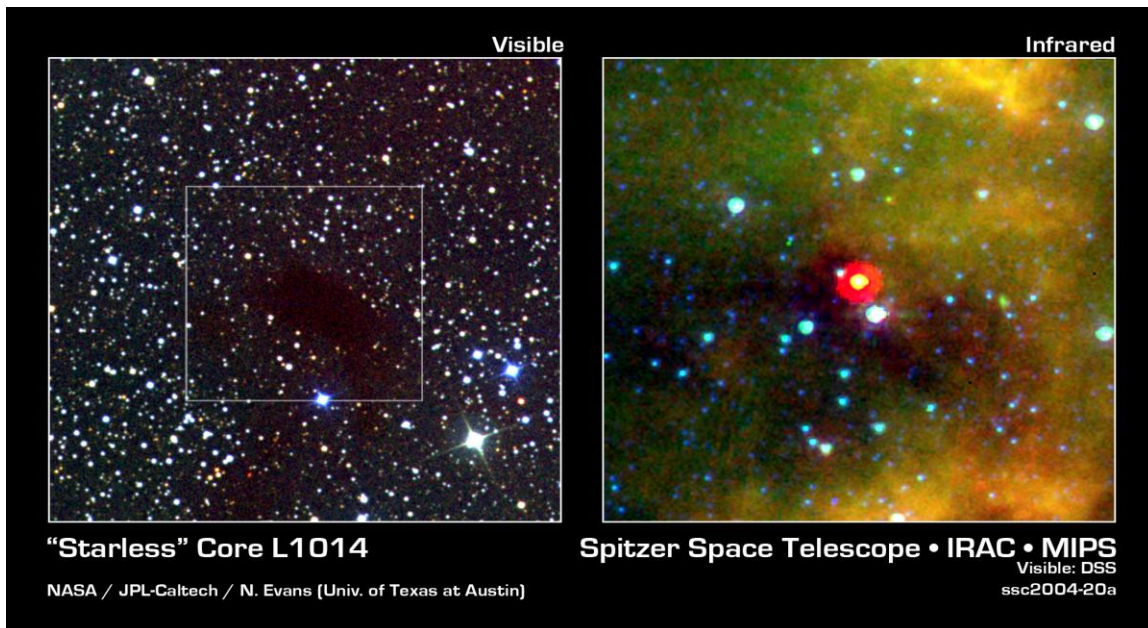
## MSU's Astronomy Newsletter

November 2009: No. 40

### *Dust in the Universe*

Cosmic dust is easily visible in the night sky, from the dust lanes woven through the Milky Way to shooting stars and the zodiacal light. Dust pervades the universe and affects our understanding of the cosmos in profound ways. These tiny particles, smaller than the household dust of everyday life here on Earth, interact with the light emitted by objects in the universe by absorbing, reflecting, or scattering it, and therefore determine how we observe the universe. Our understanding of the universe and the phenomena in it is therefore dependent upon our understanding of the characteristics of cosmic dust, and how much of it is actually out there.

One of the most important affects of dust is that by absorbing or deflecting light from objects, it makes them look fainter than they actually are, which can fool astronomers into thinking objects are farther away from Earth than they really are. Consequently, distances to objects can have large uncertainties when dust properties are not well understood. Even the measured size of our own Milky Way galaxy and of the entire universe can change (and has changed!) drastically depending on how well the effects of dust are accounted for. On somewhat smaller scales, dust densities can be so large that they block out visible light entirely, completely obscuring objects behind them. Unfortunately, such cases include sites of star formation as well as the death throes of certain types of stars, two very important astrophysical processes that astronomers still don't fully understand.



**Infrared observations with the Spitzer Space Telescope make it possible to see through thick dust clouds to stars forming within them.**

Technological advances in recent decades have enabled us to observe the universe in infrared wavelengths of light to an unprecedented degree. These wavelengths of light are longer than visible light and are much less affected by dust, effectively allowing us to "see through" dust to the objects obscured by it. Not only that, dust itself radiates energy at these long wavelengths, so it is possible to learn about its characteristics such as size and chemical composition. Such information is crucial in order to better understand how dust interacts with light. In addition, it has become more and more clear that dust plays an important role in the formation of planets and perhaps even of life itself.



Dust contributes to the beauty of this night sky scene twice over: thick dust lanes weave through the plane of the Milky Way on the left, while dust in our solar system glows to make the zodiacal light to the right.

In the November Astronomical Horizons lecture, Dr. Heather Jacobson will give a whirlwind tour of some of the properties of cosmic dust, how it interacts with light, and highlight some examples of how it has confounded and confused astronomers in their quest to understand the universe. She will also describe the tools and techniques that have been developed to study dust and the role it plays in such processes as star and planet formation.

**Free Public Lecture**  
***Our Dusty Universe***  
**by**  
**Dr. Heather Jacobson**  
Nov. 19, 2009

Future issues of the After Dark newsletter will be posted at  
[http://www.pa.msu.edu/astro/after\\_dark/after\\_dark.pdf](http://www.pa.msu.edu/astro/after_dark/after_dark.pdf)

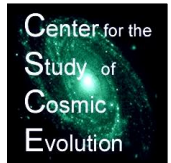
# CAMPUS OBSERVATORY PUBLIC VIEWING NIGHTS

The MSU Campus Observatory opens its doors to the public two nights per month, *weather permitting*. This is your chance to look at planets, star clusters, and other beautiful celestial objects using the 24-inch telescope and also a number of smaller telescopes. Knowledgeable professional and amateur astronomers will be on hand. But come only if the sky is clear, and dress warmly. For a map, see [www.pa.msu.edu/astro/observ](http://www.pa.msu.edu/astro/observ).

## MSU Campus Observatory Open House

Have all concluded for the fall, but will resume in the spring.

## ASTRONOMICAL HORIZONS



This popular Thursday-evening series of public lectures surveys the latest developments in astronomy. The lectures are held at the Abrams Planetarium. All programs begin at 7:30 pm, and are free of charge.

- SEPT. 24** HOT JUPITERS AND SUPER EARTHS Prof. Arunav Kundu
- OCT. 29** EXOTIC ELEMENTS IN PLANEARY NEBULAE Dr. Nicholas Sterling
- NOV. 19** OUR DUSTY UNIVERSE Dr. Heather Jacobson
- JAN. 21** GALAXIES THROUGH MANY DIFFERENT EYES Prof. Brian O'Shea
- FEB. 18** THE REJUVENATED HUBBLE SPACE TELESCOPE Prof. Steve Zepf
- MAR. 25** WHERE ARE ALL THE SUNSPOTS? Prof. Horace Smith
- APR. 22** THE NEXT GENERATION OF ASTRONOMICAL SURVEYS Prof. Tim Beers

**MICHIGAN STATE**  
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*After Dark* and the *Astronomical Horizons* lecture series are public outreach activities of Michigan State University's Center for the Study of Cosmic Evolution. Visit us at [www.pa.msu.edu/astro](http://www.pa.msu.edu/astro)