In Greek Mythology the Princess Andromeda was sacrificed to appease a sea monster's appetite, but astronomers are learning that the Andromeda Galaxy is less the spiral beauty and more the voracious beast.	*Constellation Illustration, crash-zoom to visible then IR image*
The Hidden Universe Showcase explores exciting new results in infrared astronomy from NASA's Spitzer Space Telescope… with your host, Dr. Robert Hurt	*Titles*
Have you ever noticed that if you look at a pizza edge-on it's hard to tell what you're getting? What do you think… sausage and green pepper? Changing our perspective reveals… chicken, and avocado! Hmm, that's probably not what you expected.	*HOST (holding pizza)*
Astronomers have had similar surprises when studying galaxies like the neighboring Andromeda. At a distance of 2.5 million light years, it's still the closest spiral galaxy to our own Milky Way and was considered to be nearly its twin. In fact, Andromeda, or M31, is over twice as large, holding about a trillion stars.	*Visible image of M31*
Traditionally astronomers thought it was a classic spiral galaxy with graceful, tightly wound arms. This was based on how spirals typically appear when seen from the edge. But from this perspective it's just plain hard to see what's going on in the disk. The stars are all jumbled together with the dust lanes that trace the spiral arms.	*Visible images of 3 spiral galaxies with increasing angles*

This is where the infrared eye of NASA's Spitzer Space Telescope can help sort things out. When viewing galaxies at infrared wavelengths, the dust lanes glow. Spiral arms and other structures are easy to see.	*M81 visible to IR*
Spitzer's view of Andromeda is nothing short of spectacular. In the shorter wavelengths from the IRAC instrument we see both the stars and dust lanes in sharp detail. At longer wavelengths seen by the MIPS detector, the starlight mostly fades letting us study the warm dust directly.	*M31 IRAC to MIPS fade*
Without the confusion of stars, we see Andromeda is missing one pretty common element of most spiral galaxies: the spiral! Stretching the image to simulate what we'd see from above, it's clear that most of the dust in this galaxy lies in a ring, not in arms at all.	*HOST (floating M31 image that stretches)*
What happened to the arms? The smoking gun, or rather speeding bullet, can be seen near the disk of Andromeda. Known as M32, this small satellite galaxy seems to have had a big impact.	*IRAC zoom in to M32*
Astronomers have deduced that about 210 million years ago, while dinosaurs ruled the Earth, M32 plunged through Andromeda's disk.	*HOST*
Computer simulations show that such an encounter will disrupt spiral arms. They'll morph into rings like gravitational ripples in a galactic pond. The simulations very closely match the dusty rings we see today.	*Simulation of event*

Combining the infrared view of Spitzer with the ultraviolet light captured by NASA's Galaxy Evolution Explorer offers yet another perspective. The disrupted ring and irregular splashes of the hottest young stars highlight the ongoing disruption in Andromeda. While M32 has for now ruined a beautiful spiral, it's own fate is sealed.	*Spitzer/GALEX image*
Greek mythology, rather stereotypically, recounts that daring Perseus rescued Princess Andromeda from the big, scary sea monster. But in a case of scientific role reversal we see the Andromeda galaxy is no helpless appetizer but a devouring beast itself. There are signs that it's already gobbled up other small galaxies, claming their stars as its own. M32 will be the next snack, but the main course is yet to come.	*Constellation artwork* *Cut to* *HOST*
In as little as 5 billion years, about the life expectancy of our sun, Andromeda and the Milky Way will likely collide. Our own Galaxy will merge with the larger Andromeda after a pretty spectacular show. Perhaps we need the rescue!	*Simulation: disk merger*
It just goes to show that appearances can be deceiving, in both pizzas and galaxies. Looking at either from a new perspective, like Spitzer has done with Andromeda, can yield interesting, and even tasty, surprises.	*HOST*
[while eating] For the Spitzer Science Center, I'm Dr. Robert Hurt.	