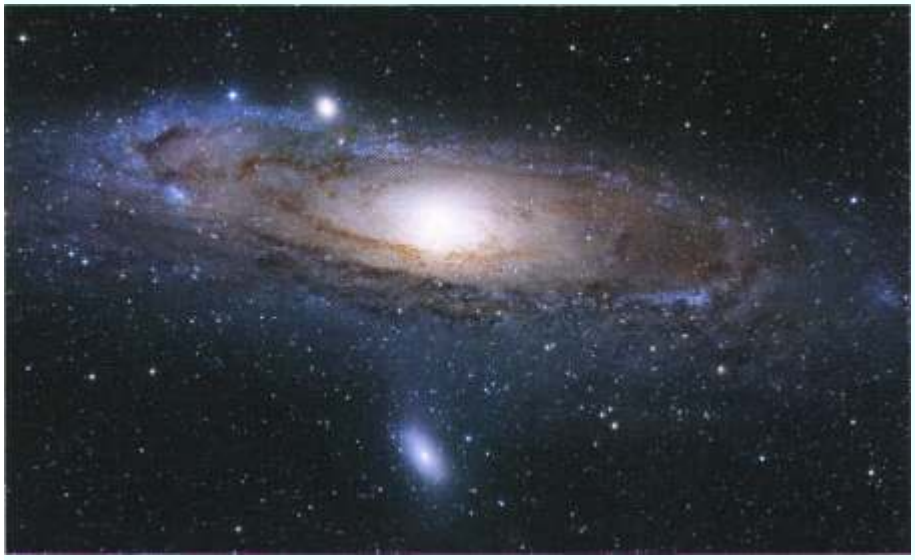
MEDIA MONITORS

Australasian Science
December, 2008
Page: 43
Section: General News
Region: National Circulation: 9,000
Type: Magazines Science / Technology
Size: 308.73 sq.cms.
Published: Monthly

Index: 1.5
Brief: SWIN



The dust clouds of Andromeda should have been a hint as that much of the universe is dulled to our eyes by dust. Photo: Robert Gendler

Universe Is Twice As Bright

Half the light in the universe is absorbed by dust clouds rather than escaping the galaxies in which it is formed. The discovery means that almost twice as much light is being produced as once thought, since previous estimates were that just 10% of light from other galaxies was trapped by internal dust.

"When we look out into deep space at the millions of other galaxies, it is as though we are wearing cosmic sunglasses – we're only seeing half the show," says Dr Alister Graham of Swinburn University's Centre for Astrophysics and Supercomputing. Graham was co-author of a paper in *Astrophysical Journal Letters* examining 10,000 galaxies to construct a model of how much light escapes a typical galaxy.

The authors looked at the light received from galaxies orientated face-on to ourselves, those that are edge-on and everything in between. Where we have a galactic edge pointed towards us we receive much less light, because so much of what we might otherwise see is absorbed by dust in the galactic plane.

In one sense it is surprising that we never noticed how much dust cuts down our view of the universe. After all, within our own galaxy dust plays such an important role that we often know more about the centres of other galaxies than of our own, despite it being hundreds of times closer. Graham can't explain why astronomers missed this point, saying:"Maybe we weren't aware the Milky Way was representative".

The situation is even more remarkable for ultraviolet light. The size of astronomical dust particles make them much more likely to absorb photons at ultraviolet wavelengths, so around 90% of UV is absorbed. Graham notes the similarity to the greater scattering of blue light in our atmosphere, making the Sun appear more reddish than it really is, particularly near sunset when its light passes through more atmosphere.

"When the dust blocks the light it is effectively heated and glows like the thermal images seen with military night vision goggles," says lead author Dr Simon Driver of the University of St Andrews. "When we look at galaxies using infrared satellites we actually see the warm dust glowing. The amount of energy which the universe is releasing at these wavelengths exactly balanced our determination of how much UV and visible light is absorbed by the dust."

The dustiness of galaxies varies considerably. Young galaxies are relatively free of dust, but as stars age they begin to produce the tiny grains of silicon and graphite that make up astronomical dust.

In large elliptical galaxies these grains are destroyed by the powerful halo of X-rays produced. However, spiral galaxies lack the X-ray halo, and the dust builds up until it becomes dense enough to cool clouds of hydrogen, encouraging the formation of new stars into which some of the gas is absorbed. Graham says that, generally speaking, older spiral galaxies are dustier but "it's not a linear process".

Graham adds: "It is somewhat poetic that in order to discover the full glory of our universe we first had to appreciate the very small."