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Cosmic Dust 'Blocks Out Half Of Starlight'

The night sky burns twice as bright as we can see but half the starlight is blocked by cosmic dust, reveals new research.

Some stars are completely obscured from our eyes while others appear much dimmer than they actually are.

Scientists have worked out for the first time the astronomical effect that space particles created by supernovas have on our view of the Milky Way and more distant galaxies.

Physicist Dr Simon Driver said: "Cosmic dust is made up of simple molecules such as graphite and silicon that are found on Earth.

"It is formed when a star explodes and the resulting atoms clump together. We have known about the phenomenon for a long time but not the extent to which it obscures starlight.

"The dust is obscuring about half of the light that the Universe is generating. Stars at the centre of galaxies are most effected.

"They can be entirely hidden although in most cases they just flicker much more dimly than they should. So there are more stars out there than we can actually see.

"Just half the energy produced by stars actually reaches our telescopes directly, the rest is blocked by these dust grains."

Dr Driver, of the University of St Andrews, said astronomers have been arguing for twenty years over whether the light that we see from distant galaxies tells the whole story.

They knew that existing models were flawed, because the energy output from glowing dust appeared to be greater than the total energy produced by the stars.

Dr Driver said: "You cannot get more energy out than you put in so we knew something was very wrong. Even so, the scale of the dust problem has come as a shock - it appears galaxies are generating twice as much starlight as previously thought."

The team, whose findings are published in *Astrophysical Journal Letters*, combined a new model of the dust distribution in galaxies with data from the Millennium Galaxy Catalogue, a state-of-the-art high resolution catalogue of 10,000 galaxies assembled by Dr Driver and his team.

Using the computer model, the astronomers could calculate precisely the fraction of starlight blocked by the dust. The key test that the new model passed was whether the energy of the absorbed starlight equated to that detected from the glowing dust.

Model developer Dr Cristina Popescu, of the University of Central Lancashire, said: "The equation balanced perfectly, and for the first time we have a total understanding of the energy output of the Universe over a monumental wavelength range.

"With the new calibrated model in hand we can now calculate precisely the fraction of starlight blocked by the dust."

Through nuclear fusion in the core of stars, the Universe is currently generating energy at a whopping rate of 5 quadrillion Watts per cubic light year - about 300 times the average energy consumption of the Earth's population.

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He said: "When the dust blocks the light, it is effectively heated and glows like the thermal images seen with military night vision goggles.

"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."

While modern instruments allow astronomers to see further into space, they cannot eliminate the obscuring effect from these tiny dust grains.

The work is set to continue but with a study of individual galaxies by the VISTA telescope, which will soon commence operations in Chile, and the Herschel satellite due for launch later in the year.

Dr Driver added: "We still are not able to observe the Universe in its full glory, but we do now better understand the effect that all of this dust is having on scientific observations."

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