A brighter universe found: ours

The Universe is twice as bright as previously believed: dust turns out to block about half the starlight from us, astronomers have found.

Interstellar dust grains have a devastating effect on our measurements of the energy output from even nearby galaxies, said Richard Tuffs of the Max Plank Institute for Nuclear Physics in Heidelberg, Germany, one of the researchers.

The dusty galaxy NGC 4565 (Courtesy Robert Gendler)

Astronomers have long known there's dust out there, but didn't know how much this restricts the light we can see. The dust itself glows, because it absorbs and then reemits starlight.

Something "very wrong" has afflicted past theories touching on the issue, said Simon Driver of the University of St Andrews, U.K., lead author of a report on the findings. The previous models, he continued, show the glowing dust's energy output as greater than the stars, total energy, which is impossible.

His team assembled a high-resolution catalogue of 10,000 galaxies and analyzed it together with a new model of galactic dust distribution developed by Tuffs and Cristina Popescu of the University of Central Lancashire, U.K.

With the new model, the astronomers said they could calculate the precise fraction of starlight blocked. The absorbed starlight energy finally equalled that detected from the glowing dust, as makes sense, they said.

"For the first time we have a total understanding of the energy output of the Universe over a monumental wavelength [light energy] range," said Popescu. (Scientists use the term "light" to include not just visible light but also the forms that are invisible to the eye because their energy is lower or higher than than what we naturally see.)

The team measured cosmic energy per cubic light-year a cube with each side's length the distance light moves in a year. Within such a space, the Universe generates some five quadrillion Watts

yearly on average, about 300 times the energy con-sumption of Earth's population, the researchers said.

The findings appear in the May 10 issue of the research publication Astrophysical Journal Letters.

The team measured the brightness of thousands of disc-shaped galaxies with different orientations, then matched the results to computer models of dusty galaxies. Based on this they calibrated the models to find out how much light is blocked when a galaxy is seen face-on. This in turn let them determine the fraction of galactic light that escapes in each direction.

"For over 70 years an accurate description of how galaxies, the locations where matter is churned into energy, form and evolve has eluded us," said Driver. "Balancing the cosmic energy budget, is an important step forward."

Source: Science & Technology Facilities Council, U.K. and World Science staff