

# Ten trillionths of your suntan comes from beyond our galaxy

August 11 2016



Infographic explaining the fact that 10 trillionths of a suntan comes from beyond our galaxy. Credit: ICRAR/Dan Hutton

Lie on the beach this summer and your body will be bombarded by about

sextillion photons of light per second.

Most of these [photons](#), or small packets of energy, originate from the Sun but a very small fraction have travelled across the Universe for billions of years before ending their existence when they collide with your skin.

In a new study to be published in the *Astrophysical Journal* on August 12th, astronomers have accurately measured the light hitting the Earth from outside our galaxy over a very broad wavelength range.

The research looked at photons whose wavelengths vary from a fraction of a micron (damaging) to millimetres (harmless).

But radiation from outside the galaxy constitutes only ten trillionths of your suntan, so there is no immediate need for alarm.

International Centre for Radio Astronomy Research (ICRAR) astrophysicist Professor Simon Driver, who led the study, said we are constantly bombarded by about 10 billion photons per second from intergalactic space when we're outside, day and night.

"Most of the photons of light hitting us originate from the Sun, whether directly, scattered by the sky, or reflected off dust in the Solar System," he said.

"However, we're also bathed in radiation from beyond our galaxy, called the extra-galactic background light.

These photons are minted in the cores of stars in distant galaxies, and from matter as it spirals into [supermassive black holes](#)."

Professor Driver, who is based at the University of Western Australia,

measured this ambient radiation from the Universe, from a wide range of wavelengths by combining deep images from a flotilla of space telescopes.

He and collaborators from Arizona State University and Cardiff University collated observations from NASA's Galaxy Evolution Explorer and Wide-field Infrared Survey Explorer telescopes, the Spitzer and Hubble space telescopes, the European Space Agency's Herschel space observatory and Australia's Galaxy And Mass Assembly survey to make the most accurate measurements ever of the extra-galactic background light.

While 10 billion photons a second might sound like a lot, Professor Driver said we would have to bask in it for trillions of years before it caused any long-lasting damage.

Professor Rogier Windhorst, from Arizona State University, said the Universe also comes with its own inbuilt protection as about half the energy coming from the ultraviolet light of galaxies is converted into a less damaging wavelength by dust grains.

"The galaxies themselves provide us with a natural suntan lotion with an SPF of about two," he said.

The study is part of ICRAR's ongoing work to understand the evolution of energy, mass and structure in the Universe.

The research program examines how we went from the smooth distribution of atoms in the early Universe to the emergence of the Periodic Table and the multitude of stars, [galaxies](#) and galaxy clusters we see today.

"The processes which shape and shuffle mass generate vast quantities of

energy, dwarfed only by the vastness of space," Professor Driver said.

"The precise physics as to how this energy is released is still not fully understood and work continues to build numerical models capable of explaining the energy that we've now measured."

The research will be published in *The Astrophysical Journal* on August 12th.

**More information:** 'Measurements of Extragalactic Background Light from the FAR-UV to the FAR-IR from Deep Ground and Space based galaxy counts,' published in in the *Astrophysical Journal* on August 12th, 2016.

Provided by International Centre for Radio Astronomy Research

Citation: Ten trillionths of your suntan comes from beyond our galaxy (2016, August 11)  
retrieved 26 April 2024 from <https://phys.org/news/2016-08-ten-trillionths-suntan-galaxy.html>

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