

# New technique for isolating sunny-day 'light' scattering could help illuminate Universe's birth

May 28 2015

---



The process that makes the sky appear blue could allow us to better understand our early Universe. Credit: Flickr, CC, Jon Rawlinson.

Astrophysicists have developed a new method for calculating the effect of Rayleigh scattering on photons, potentially allowing researchers to better understand the formation of the Universe.

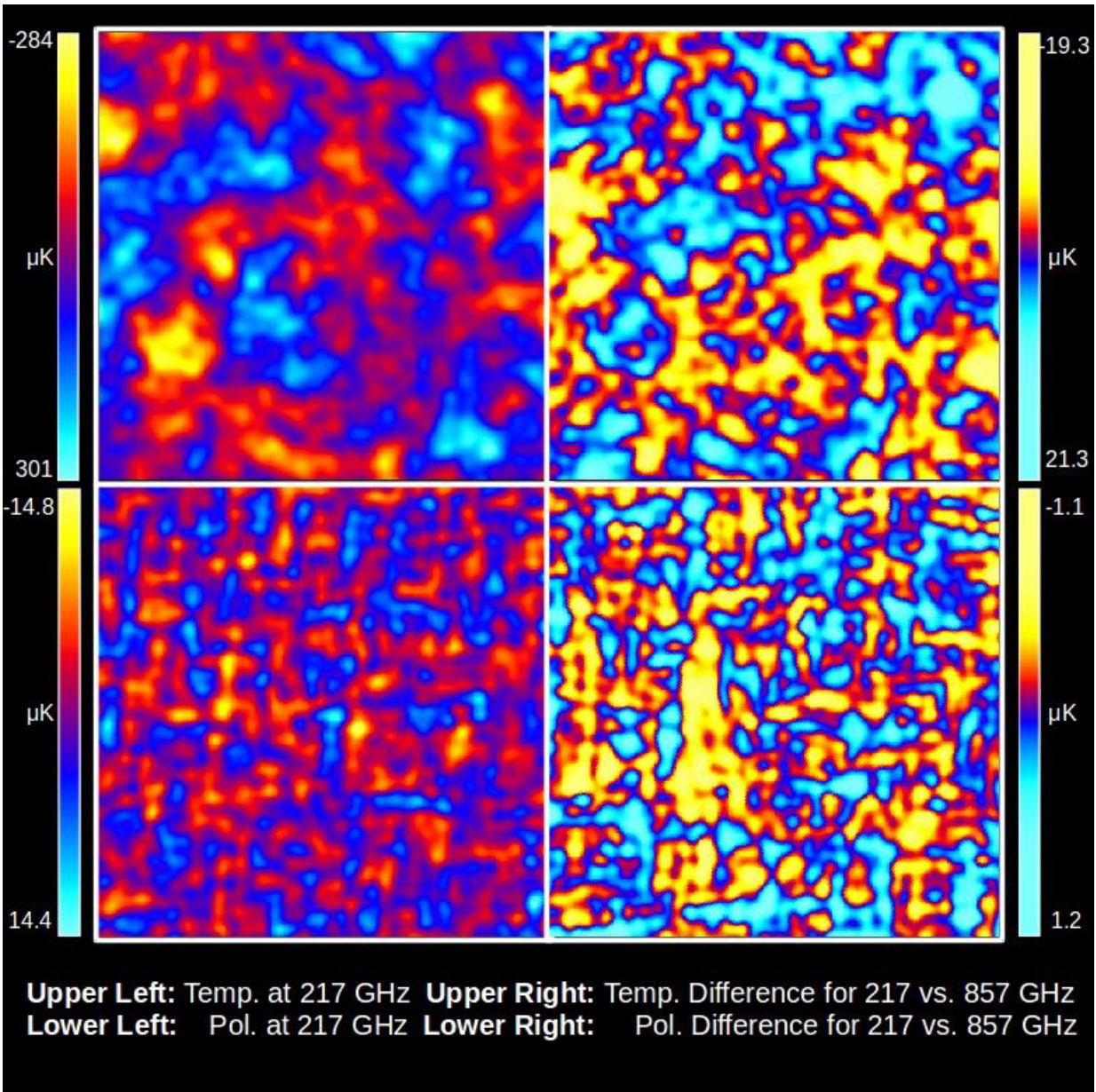
UBC theoretical cosmology graduate student Elham Alipour, UBC physicist Kris Sigurdson and Ohio State University astrophysicist Christopher Hirata probed the effect of Rayleigh scattering—the process that makes the sky appear blue when the Sun's photons are scattered by molecules in the atmosphere—on the [cosmic microwave background](#)

(CMB).

The CMB is the oldest light in the [universe](#), which originated when electrons combined with protons to form the first atoms. These primordial atoms were also the first to Rayleigh scatter light.

"Detecting the Rayleigh signal is challenging because the frequency range where Rayleigh scattering has the biggest effect is contaminated by 'noise' and foregrounds, such as galactic dust," lead author Elham Alipour said.

By using different high-frequency channels to observe the CMB and combining this information, researchers may be able to better isolate the Rayleigh signal. This calculation of the effects of Rayleigh [scattering](#) on cosmology might help us better understand the formation of our Universe 13.6 billion years ago.



By using different high-frequency channels to observe the CMB and combining this information, researchers may be able to better isolate the Rayleigh signal.  
 Credit: UBC

"The CMB sky is a snapshot of the early Universe, it is a single frame in the movie of the Universe, and we have shown that Rayleigh signal gives

us another fainter snapshot of the same scene at a slightly different time," co-author Kris Sigurdson explained.

The findings have been highlighted in *Physical Review D*.

**More information:** "Effects of Rayleigh scattering on the CMB and cosmic structure" [journals.aps.org/prd/abstract/...  
3/PhysRevD.91.083520](https://journals.aps.org/prd/abstract/10.1103/PhysRevD.91.083520)

Provided by University of British Columbia

Citation: New technique for isolating sunny-day 'light' scattering could help illuminate Universe's birth (2015, May 28) retrieved 18 April 2024 from <https://phys.org/news/2015-05-technique-isolating-sunny-day-illuminate-universe.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.