

Scientists observe how black holes eat matter

June 11 2010

(PhysOrg.com) -- For the first time, scientists have been able to observe matter falling into super massive black holes.

University of Melbourne and Anglo-Australian Observatory astronomer Dr David Floyd and colleagues have probed into a region inaccessible to telescopes until now.

Using a state-of-the-art technique called gravitational microlensing, it is the first time scientists have been able to see how black holes consume or eat matter.

Dr Floyd from the School of Physics at the University of Melbourne and the Anglo-Australian Observatory says it heralds a new era in exploring <u>black holes</u>.

"This technique can probe regions just a few times larger than the black hole at the centre of a quasar in a matter of minutes, rather than decades."

Material in the immediate vicinity of a black hole undergoes extreme compression and superheating. The result is a quasar, which emits so much energy as visible light, that it can outshine the galaxy in which it is located by many thousands of times.

"The problem is that the regions emitting these huge amounts of light are so small and their distance from Earth so mind-bogglingly far, that it has been impossible to observe them directly, and therefore to understand



the part they play in the evolution of the Universe," Dr Floyd says.

"Conditions in a quasar are so extreme that they push the laws of physics to breaking point and beyond. They are the particle accelerators of the Universe. They shape galaxies and drive the evolution of the Universe."

The research makes use of a technique known as gravitational microlensing, where the light from a quasar passes near or through another galaxy on its way to earth. The intervening galaxy acts like a lens, enlarging and splitting the image of the quasar into several components, each of which can be analysed.

Using data from the 6.5-metre Magellan telescope in northern Chile and the NASA <u>Hubble Space Telescope</u>, Dr Floyd and his University of Melbourne colleagues, Dr Nick Bate and Professor Rachel Webster, have shown that about 99 per cent of the visible light in the quasar with which they have been working is produced in a region just a thousand times larger than the black hole itself.

"This is so tiny in astronomical terms that it would take a telescope with a lens 100 kilometres across to observe directly," Dr Floyd says.

"It is exciting that we have been able to study these phenomena at these distances at all," he says. "These early results are just a taste of what's to come."

Provided by University of Melbourne

Citation: Scientists observe how black holes eat matter (2010, June 11) retrieved 27 April 2024 from <u>https://phys.org/news/2010-06-scientists-black-holes.html</u>

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.