Solar terrestrial website up and running

A new website offering a window on the Sun and its effects on this and other planets is now up and running – and more researchers are needed to provide material on research areas and answer questions from the public.

The sunearthplan.net website showcases UK solar, solar–terrestrial and solar–planetary research for a broad general audience; it is funded by PPARC until September 2008 and has been launched to coincide with the International Geophysical Year. Currently, the site showcases UK research across the full spectrum of the MIST and UKSP fields. It is a professional job: the material comes from a cross-section of the UK research community, the articles are written by an experienced science writer and the website was built by a professional web design team. As well as reading the science stories, visitors can post questions to be answered by research active scientists.

The site does not yet include every aspect of the diverse research community. Anyone in a field that is not already represented on the site can contact James Wild (j.wild@lancaster.ac.uk) so that the team can get on getting it included. This is not a time-consuming task – most people who have already contributed simply submitted a page or so of text and a couple of images (sometimes followed up by a telephone conversation with the site’s science writer). Similarly, if you fancy a challenge and would like to tackle some of the questions posed by the site’s visitors, let James Wild know and he’ll be happy to explain the Q&A process.

http://www.sunearthplan.net

Quasar clusters and dark matter

Sloan Digital Sky Survey data have shown that ancient quasars are much more closely clustered together than comparable younger objects. They tend to be part of large dark-matter halos around supermassive black holes, themselves a problematic part of the early universe.

More than 4000 luminous quasars over 11 billion years old from the SDSS were used to map the dark matter distribution in the early universe, by Princeton University graduate student Yue Shen, who led the study and is publishing the results in The Astrophysical Journal.

The image shows the distribution of dark matter, massive haloes, and luminous quasars in a simulation of the early universe 1.6 billion years after the Big Bang, in a box 360 million light-years across. Dark matter is shown by grey filaments and small white circles mark concentrations of dark matter more than 3 trillion times the mass of the Sun. Larger, blue circles mark the most massive halos, more than 7 trillion times the mass of the Sun, which host the most luminous quasars. The clustering is much stronger than in younger nearer quasars and points to much bigger dark matter halos around these ancient galaxies, several trillion times the mass of the Sun.

Although this is roughly what theories predict, the origin of such large halos at a time when the universe was only one-tenth of its current size remains uncertain. Further work using the SDSS data may clarify this.

Good news and bad news for extrasolar planets

NASA’s Spitzer Space Telescope has achieved an important step forward in exploring planetary systems: researchers have a technique to pick out the spectroscopic signatures of molecules such as water in extrasolar planets. That’s the good news. The bad news is that the first planets to be analysed in this way show no signs of water.

The planets in question, HD 189733b, in the constellation Vulpecula, and HD 209458b, in Pegasus, are both “hot Jupiters”, large gassy planets orbiting close to their stars. Spitzer proved eminently suitable for picking out the infrared spectroscopic signal from transiting planets. The “secondary eclipse” technique used could have picked out molecules such as water and methane, but did not.

The data, from independent research teams, indicate that both planets are drier and cloudier than predicted. It is thought unlikely that hot Jupiters could form without water in their atmospheres, so the water may be hidden. One planet, HD 209458b, showed hints of silicate grains in its atmosphere. Any water present could be hidden under high, dusty clouds unlike anything around planets in our solar system.

Jeremy Richardson of NASA’s Goddard Space Flight Center and team describe a spectrum for HD 209458b in Nature, as did – independently – a team led by Mark R Swain of JPL, who have submitted the work to Astrophysical Journal Letters. A team led by Carl Grillmair of NASA’s Spitzer Science Center at CalTech captured the spectrum of HD 189733b, to be published in the Astrophysical Journal Letters.