



### FORTHCOMING MEETINGS

(All meetings begin at 7:30pm)

#### Tuesday, January 27<sup>th</sup>

"Deep Space in Wiltshire"

(Philip Perkins)

<http://www.astrocruise.com>

Philip produces stunning astronomical images of outstanding quality from the back garden of his home in Wiltshire.

#### Wednesday, February 11<sup>th</sup>

Club Night

"Amazing Astronomical Facts"

Come along and bring your favourite pieces of astronomical or science trivia.

#### Tuesday, February 24<sup>th</sup>

"Infrared Astronomy"

(Dr Christopher J Baddiley)

His talk will cover all the historical ground and space infrared systems as well as all major infrared observatories. A long time ago it was his professional 'specialist' subject.

#### Wednesday, March 10<sup>th</sup>

Club Night

"Using the Society's Spectroscope"

#### Tuesday, March 23<sup>rd</sup>

"Compact Binary Stars"

(Dr Ulrich Kolb)

<http://physics.open.ac.uk/~uckolb/>

The study of binary stars is fundamental to all areas of astrophysics. Most stars reside in binaries; measurements of the dynamical interaction of the components provide the most accurately determined parameters of stars. Exotic interacting binaries with collapsed stars are among the most powerful energy sources in the Universe, outshining their host galaxies. Interacting binaries are a rich laboratory for a wide variety of astrophysical phenomena.

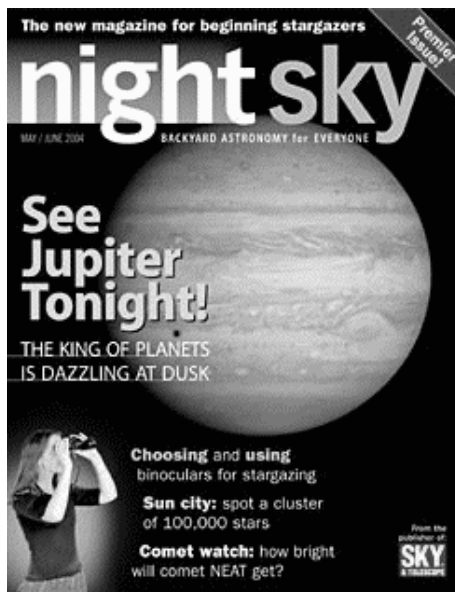
Particularly promising is the study of compact binaries, interacting double stars where a normal star transfers mass to a compact object, a stellar corpse, the collapsed endstate of stellar evolution. The transferred matter heats up dramatically as it funnels down the compact object's potential well, causing the emission of high-energy radiation. Compact binaries with a neutron star or black hole (X-ray

binaries) are the most powerful X-ray sources in the Galaxy, while white dwarf systems, (cataclysmic variables, CVs) are easily recognised from the distinct time-variability in the optical waveband.

### SKY & TELESCOPE MAGAZINES, ANYONE?

Andrew Baxter has just completed a New Year's 'spring' clean and has hundreds of Sky and Telescope magazines that he no longer needs. He wondered if any members would like them. You can contact Andrew on 01295 670485.

### "NIGHT SKY"



This new American bi-monthly magazine from the publishers of Sky and Telescope is aimed at those new to observing in their 'backyard'. Hopefully it will be distributed over this side of the pond beginning with the May/June 2004 issue. It retails for just under \$4 but as an import it may cost more than the equivalent in pounds.

<http://nightskymag.com/>

### ASTRO-HOLIDAYS

Some time ago last November, the Wednesday evening's Club Night theme was "Favourite Astronomy & Dark Sky Holiday Locations". Here is the featured list of a variety of places to visit for a day out or for a week or two, depending on your interests in astronomy. If you can recommend a holiday destination or dark site why not send me the details so that I can pass it on. You'll find all my contact details at the bottom of page two – [Ed]

#### The Astronomy Centre

An ambitious observatory project situated midway between the towns of Bacup and Todmorden sitting 1,100 feet above sea level.

<http://www.astronomycentre.org.uk>  
North Midgelden Farm, Bacup Road,  
Todmorden, Lancs, OL14 7HW  
(01706) 815816

#### Madog Wells

Superb dark skies for the on-site 16" [40cm] 'Dark Star' Dobsonian with NGC Max computer. They are becoming increasingly popular with societies who find it an ideal location. They also offer free tuition for beginners.  
<http://www.stayinwales.co.uk/detail.cfm?idnum=338>  
Llanfair Caereinion, Welshpool, Powys, SY21 0DE (01938) 810446

#### Worth Hill Observatory

A privately owned observatory on the South Dorset Coast with dark skies and an excellent horizon.

<http://www.dstrange.freemove.co.uk>  
Worth Hill Observatory, Worth Matravers, Swanage, Dorset, BH19 3LF

#### The Fieldview Astronomy Centre

Opened in 1996 to provide astronomers with a dark and comfortable site to pursue their hobby. These are the same people who run Earth and Sky Books.

<http://www.fieldview.net>  
West Barsham Road, East Barsham, North Norfolk NR21 0AR  
(01328) 820083

#### Spaceguard Centre

The Spaceguard Centre is located at the former Powys Observatory that overlooks the town of Knighton in mid-Wales.

<http://www.spaceguarduk.com/visit.htm>

**Lockyer Observatory and Planetarium,**  
Wonderful range of vintage scopes and other facilities.

<http://www.ex.ac.uk/nlo/welcome.htm>  
Salcombe Hill, Sidmouth, Devon, EX10 0NY

#### COAA

COAA is the well known astronomy holiday centre, based in the Algarve region of southern Portugal, which is designed to give amateur astronomers the opportunity to use larger telescopes under exceptionally favourable observing conditions.

<http://www.ip.pt/coaa/>

#### CDEPA

CDEPA stands for Casa De Estudo Para Astronomia it is an easy going villa with the added interest of observing and enjoying the dark sky of Portugal.  
<http://www.cdepa.pt>

#### The Observatory

Built for astronomical purposes in 1906 to take advantage of the wide open skies and lack of light pollution. Now converted to a comfortable house in the country, it has uninterrupted views over Loch

Steve Smith (Chair)  
0121 458 4197 ([steve.smith@astro.org.uk](mailto:steve.smith@astro.org.uk))

Robin Swinbourne (Secretary)  
01926 882187 ([robin.swinbourne@astro.org.uk](mailto:robin.swinbourne@astro.org.uk))

Lynda Smith (Treasurer & Membership)  
01295 267368 ([lynda.smith@astro.org.uk](mailto:lynda.smith@astro.org.uk))

Chris Benton (Webmaster)  
07985 106320 ([chris.benton@astro.org.uk](mailto:chris.benton@astro.org.uk))

Ken Sheldon (Vice Chair)  
01386 860202 ([ken.sheldon@astro.org.uk](mailto:ken.sheldon@astro.org.uk))

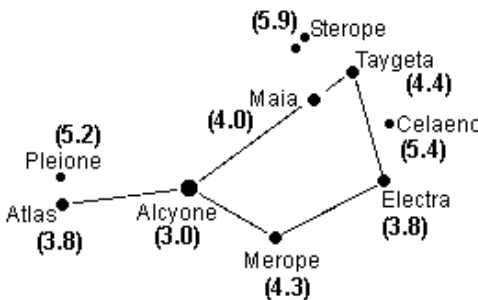
Mike Whitecross (Events)  
01789 731784 ([mike.whitecross@astro.org.uk](mailto:mike.whitecross@astro.org.uk))

Faskally and the Grampian Mountains and is available for self catering accommodation.

<http://www.observatorypitlochry.com>

### HIPPARCOS GLITCH?

This European satellite, named after the ancient Greek astronomer, was designed to measure both the position and motion of stars to an unprecedented degree of accuracy. Its mission lasted four years beginning in 1993 and enabled astronomers to produce a 17-volume 3D map of the Universe.



### M45 The Pleiades

However, a pair of Caltech astronomers are suggesting that it may have 'got its sums wrong' when it comes to the distance of the Pleiades star cluster. They studied the movement of a pair of binary stars in the cluster as a way to measure just how far away they were. To their surprise their results agreed with traditional distance estimates and not with those from Hipparcos. Using data from the Mount Wilson stellar interferometer, next to the historic Mount Wilson Observatory, and the Palomar Testbed Interferometer at Caltech's Palomar Observatory near San Diego, the team determined a precise orbit of the Atlas-Pleione binary system. The results show that the double star Atlas is between 434 and 446 light-years from Earth, which is roughly 10% further than the distance calculated from Hipparcos data.

Some scientists think that it may be an isolated error because of the small area of sky covered by the Pleiades and the method of measurement. Others say that the mistake may be due to the satellite entering an unusual orbit caused by the failure of some of its booster rockets shortly after launch.

### ANDROMEDA BOOKS CATALOGUE #13

The new catalogue from Andromeda Books is available online at:

<http://www.andromedabooks.co.uk>

If you would prefer a printed copy then you can request one by phoning them on (01908) 312046. Their free catalogues usually come out about 3 or 4 times a year.

They are a mail order business, specializing in out-of-print, rare, used, and hard-to-find astronomy (and art) books. They started through their own interest in astronomy and love of books back in 1998, with a small collection of second-hand astronomy titles. This has now grown into a stock of nearly 2,000 different titles. Although technically second-hand, the large majority of our books are in mint, fine, or very good condition. Others are in good condition and a few are sold as reading copies only. The price of a particular book reflects its condition and rarity, and also includes postage and package within the UK. They will supply you with a quote for overseas orders.

### FEEL THE FORCE

NASA scientists have for the first time detected a tiny but theoretically important force acting on asteroids by measuring an extremely subtle change in a near-Earth asteroid's orbital path. This force, called the 'Yarkovsky Effect', is produced by the way an asteroid absorbs energy from the sun and re-radiates it into space as heat. The research will impact how scientists understand and track asteroids in the future.

Asteroid 6489 "Golevka" is relatively inconspicuous by near-Earth asteroid standards. It is only half a kilometre across, although it weighs in at about 210 billion kilograms. But as unremarkable as Golevka is on a celestial scale it is also relatively well characterized, having been observed via radar in 1991, 1995, 1999 and last year in May. An international team of astronomers, including researchers from NASA's Jet Propulsion Laboratory, have used this comprehensive data set to make a detailed analysis of the asteroid's orbital path.

"For the first time we have proven that asteroids can literally propel themselves through space, albeit very slowly," said Dr. Steven Chesley, a scientist at NASA's Jet Propulsion Laboratory and leader of the study.

The idea behind the Yarkovsky Effect is the simple notion that an asteroid's surface is heated by the sun during the day and then cools off during the night. Because of this the asteroid tends to emit more heat from its afternoon side, just as the evening twilight on Earth is warmer than the morning twilight. This unbalanced thermal radiation produces a tiny acceleration that has until now gone unmeasured.

The amount of force exerted by the Yarkovsky Effect on Golevka is incredibly small considering its mass. It is the equivalent of holding four £1 coins in your hand. But over the 12 years that Golevka

has been observed, that small force has caused a shift of 15 kilometres. Apply that same force over tens of millions of years and it can have a huge effect on an asteroid's orbit. Asteroids that orbit the Sun between Mars and Jupiter can actually become near-Earth asteroids.

The Effect has become an essential tool for understanding several aspects of asteroid dynamics. Theoreticians have used it to explain such phenomena as the rate of asteroid transport from the main belt to the inner solar system, the ages of meteorite samples, and the characteristics of so-called "asteroid families" that are formed when a larger asteroid is disrupted by collision. And yet, despite its profound theoretical significance, the force has never been detected, much less measured, for any asteroid until now.

Once a near-Earth asteroid is discovered, radar is the most powerful astronomical technique for measuring its physical characteristics and determining its exact orbit. Using the measurement of the Yarkovsky acceleration the team has for the first time determined the mass and density of a small solitary asteroid using ground-based observations. This opens up a whole new avenue of study for near-Earth asteroids, and it is only a matter of time before many more asteroids are "weighed" in this manner.

### SKIM TO WIN

If you want to know how to beat your friends at stone skimming contests then take heed of the latest research from a team of French scientists. They have discovered that there is a magic angle to aim for in your chosen stone's first bounce on the water – 20 degrees.

They built a stone skimming machine to find out the optimum speed, spin, and angle for the maximum number of bounces. A stone will skip over a water surface for much the same reason that a water skier is able to skim across the surface. The stone and water skier receive a force from the water related to the speed with which they travel across it, which turns out to be directly proportional to the square of the stone's speed. The spin you impart helps stabilize the stone as it flies through the air and bounces off the water, making it less likely to veer off course. Their research showed that stones which enter the water at angles less than 20 degrees bounce but lose much of their energy dragging through the water, while stones that enter at angles greater than 45 degrees don't bounce at all - they sink.

The world record is currently held by Jerdone Coleman McGhee of Wimberley, Texas who, in 1992, achieved an impressive 38 bounces across the Blanco River in central Texas. This required the stone to be tossed at 25 mph (40 km/h) with a spin of 14 rotations per second.

