Galaxies galore in Leo

In springtime, the delights of the myriad of galaxies to be found in Coma and Virgo are very tempting, but wait a little, and be sure to take in the many galaxies to be found in Leo first.

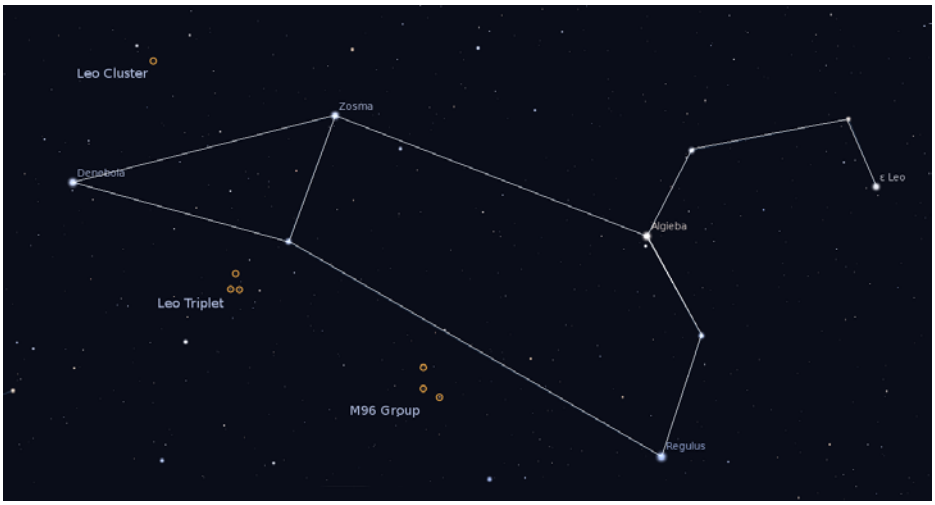
The most popular galaxy target in Leo is no doubt the 'Leo Triplet' – M65, M66 and NGC 3628. All fairly easy with even a small scope of 15cm or 20cm aperture, and will be nicely framed in a one degree field eyepiece, or slightly smaller. To get a better view of the galaxies do try and use more magnification, though, to tease out the details. These three galaxies are an actual physical group, lying about 35 million light years away, and may be part of our next target, the M96 group of galaxies, sometimes referred to as the Leo 1 Group.

M65 is a fairly standard spiral galaxy. M66 is a somewhat more interesting spiral, with deformed arms, and NGC 3628 is an edge-on spiral a little fainter than the Messiers.

M96 and M95 are companions separated by about 40 minutes of arc, with M105 some 50 minutes north of M96. M96 is a nice face-on spiral, while M95 is a notable barred spiral. M105 is a giant elliptical galaxy, the brightest of the M96 Group, and a fairly typical representative of its class.

Near to M105 is a further nice pair of elliptical galaxies, NGC 3384 and NGC 3389 – both just a little fainter than M105 (mag 9.2) at around mag10 and mag 11 – though NGC 3389 is thought to be a background galaxy and not a group member. Moving 1° 20' North, we come to another bright group member, the elliptical galaxy NGC 3377 (mag 10.2).

The Leo Triplet. *Stellarview 102mm ED APPO refractor, Canon 40D DSLR. f/5.6, 12×300 sec at ISO 400. Keith Grice.*



All told there are probably more than 20 members of the group (including the Leo Triplet), and it would be interesting to try to see how many can be observed. Some are rather faint for visual observers, but should be within easy reach of imagers.

Not to be confused with the Leo 1 Group is the Leo Cluster, a more compact group of galaxies to be found at the west end of Leo, and also known as Abell 1367. This is unconnected with the M96 group, being around 300 million light years distant. These are all fairly faint galaxies and a bigger telescope will be needed to pick them up, but many should still be within easy reach of astro-imagers. The brightest of these are NGCs 3842 (mag 12.8), 3816

Spiral galaxies M95 *(right)* and M96. *100mm F6 ED Apo, 3×10 minute exposures in each of LRGB filters. Calibrated & stacked in Maxim DL5, processed in Photoshop CS3. Chris Longhorn.*

The spheroidal dwarf galaxy Leo I *with Regulus, some 10,000 times brighter, dominating the field. 105mm unfiltered, SXVR-H18 CCD. f/2.8, 30×60 sec. Richard Miles.*

(13.5), 3861 (13.5), 3884 (13.5) and 3883 (13.4). There is a fairly bright star, HIP 57335 of magnitude 7.5, which makes a good locator for the cluster.

A further object for confusion is Leo I – a dwarf spheroidal galaxy. It is about magnitude 9.8, and lies close to Regulus, only 12 arcminutes away from Leo's brightest star. This makes it rather difficult to observe visually, and you will need to arrange your view to try to keep Regulus out of the field. It is also fairly spread out and diffuse, so a low power may help.

Leo I is part of our local group of galaxies, and is about 820,000 light years distant. It is well worth seeking out, as it is one of the furthest satellite galaxies of our own Milky Way.

Callum Potter, *Director, Deep Sky Section*

Comet Section meeting on Saturday, May 18

This year should see two bright comets visible from our latitudes, C/2011 L4 (PanSTARRS) and C/2012 S1 (ISON). The Comet Section has arranged a meeting at the Humfrey Rooms, Northampton, on Saturday, May 18 to discuss these exciting objects and the techniques that can be used to observe them.

Doors open at 9:30am. The meeting will run from 10am to 6pm and there will be ample time for discussion with fellow observers. Entry (at the door) is £5 (BAA members), £7.50 (non-members) and this includes morning and afternoon tea/coffee. There are plenty of local places for lunch or bring your own.

The programme is provisional but the following speakers are expected:

- Jonathan Shanklin - The Comet Section
- Denis Buczynski - Wide field imaging of comets
- Guy Hurst - Observing comets visually
- Glyn Marsh - Making a DIY comet
- Nick James - Photometry of comets. Why, what and how?
- Roger Dymock - Visual equivalent magnitudes from CCD observations
- Prof. Alan Fitzsimmons - Comets: why professionals need amateurs

Further information is available on the BAA website at www.britastro.org/cometmeeting2013.

CCD and spectroscopic observations of Nova Cephei 2013

Nova Cep 2013 was discovered by two Japanese astronomers, Koichi Nishiyama & Fujio Kabashima, on CCD images taken on 2013 Feb 2 at approximately 09:50UT. Their discovery was reported shortly afterwards on the IAU Transient Objects Confirmation Page as PNV J23080471+6046521. I heard about it via a message on an AAVSO forum at 11:17UT the same day. This is a good example of how the internet has reduced an information dissemination process which used to take days to just a few minutes. At a reported magnitude of 10.3 the nova was bright enough for both photometric and spectroscopic observation with amateur equipment.

Fortunately that night was clear so I recorded a sequence of images using B, V, R and I photometric filters on my 0.35m SCT with an SXVR-H9 CCD camera. By using filters it is possible to transform your measured magnitudes to photometric standard magnitudes, and to deduce the colour as well as the magnitude of an object. I was just starting to experiment with a Star Analyser diffraction grating in my filter wheel so I also recorded a series of low resolution spectra of the nova.

Over the coming weeks, whenever weather permitted, I obtained further photometry and spectroscopy. The nova appeared to reach peak brightness around Feb 4 and has gradually faded since. Figure 1 shows how the magnitude and colour of the nova have changed during the month since discovery. An increase in colour index indicates a reddening of the nova. (The lines are purely to aid the eye and have no physical significance.)

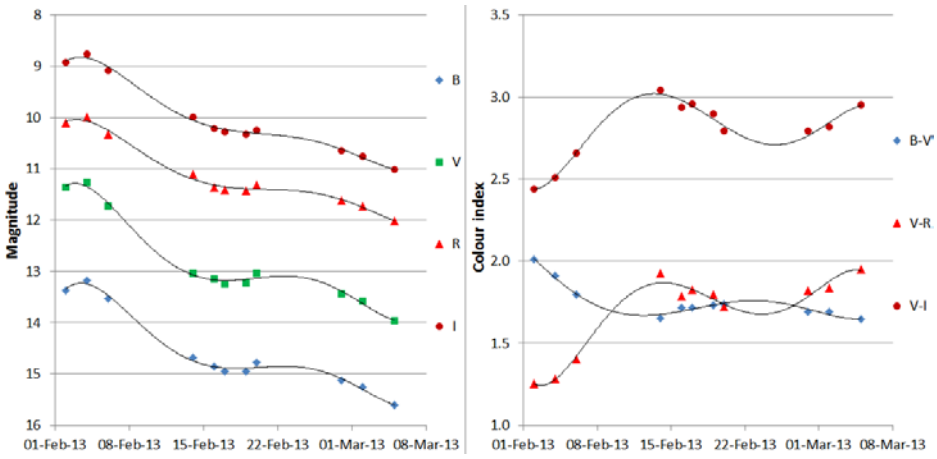


Figure 1. Filtered photometric observations of Nova Cep 2013.

Figure 2 shows three spectra taken at two-week intervals. The H-alpha emission line was very weak on the day of discovery but increased in strength over the next two weeks through radiative de-excitation of ionised hydrogen. Figure 1 shows there was a corresponding reddening of the nova around mid-February. In the second half of February the H-alpha peak has reduced slightly. The spectra in Figure 2 have been displaced vertically so they can be seen more clearly. In practice the continuum level is the same for all three spectra. There is little other resolved structure in the spectrum at this stage of the nova's evolution, and it will be interesting to see how this changes over the coming months.

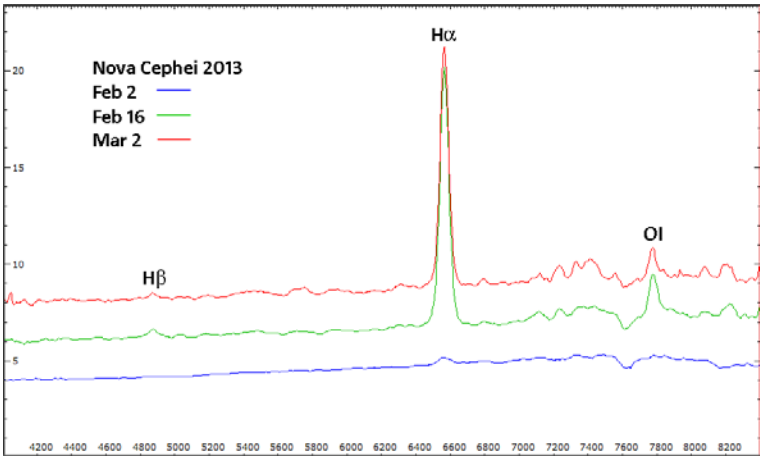


Figure 2. Spectra of Nova Cep 2013.

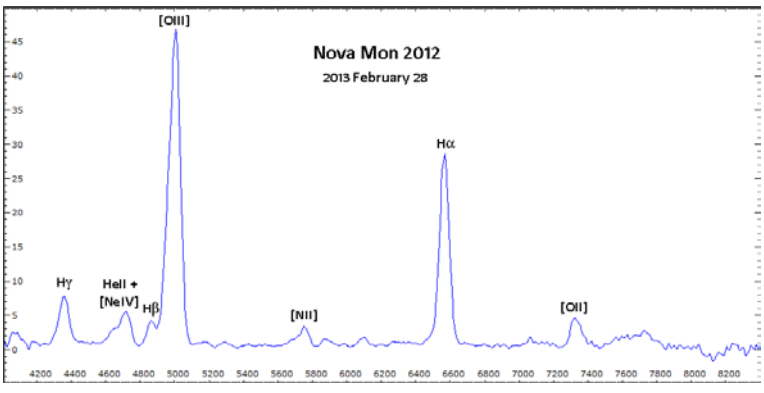


Figure 3. Spectrum of Nova Mon 2012.

By way of contrast, Figure 3 shows a spectrum of the older Nova Mon 2012 taken with the same equipment on February 28. This Neon nova shows a more complex spectrum with a particularly strong [OIII] line. The main spectral lines are identified in *Astronomer's Telegram ATEL 4709*.

This is my first attempt at low resolution spectroscopy and it has been an interesting challenge getting to grips with the software and processing techniques involved. I used the Be star Gamma Cassiopeiae, which has strong H-alpha emission, to focus on the H-alpha spectral line. Because the diffraction grating produces a cylindrical focal plane, it was necessary to move the CCD closer to the telescope compared to its normal focal position. Each night I recorded a series of spectral images which I then stacked with *Astroart*. I used *ISIS* to extract a wavelength-calibrated and instrument-response-corrected spectrum from the stacked image, and *VisualSpec* to display the spectral profile.

Low resolution spectroscopy adds an interesting extra dimension to observing such objects and reveals more about them than does photometry alone. I would particularly like to acknowledge the help given to me by Robin Leadbeater as I have struggled up the spectroscopic learning curve.

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