

## The Discovery of Comet C/2014 Q2

Comet C/2014 Q2 is my latest comet discovery having been found in the constellation of Puppis on the morning of August 17 (August 18 local time). At the time a small inconspicuous object of magnitude 15, it is due to become at least visible in small telescopes during the New Year.

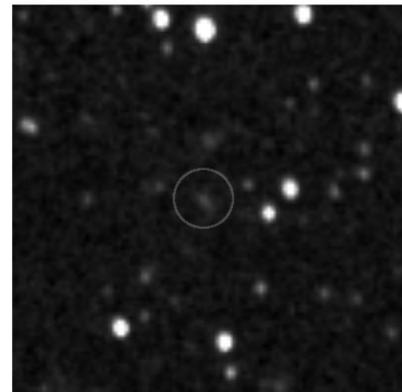
Like my last 3 discoveries this one was made using a Celestron "C8" 20cm Schmidt Cassegrain scope equipped with a Hyperstar corrector. A QHY9 camera and Vixen Sphinx round out the equipment. Mount and Camera operations are all automated via ASCOM and Maxim DL in conjunction with a series of custom Windows PowerShell scripts.



*Roll-off roof Observatory - Site Code Q80*

The detection process itself uses a custom program (in conjunction to Source Extractor) that compares 3 images of the same star field, looking in particular for "movers". Movers are objects that have shifted in a consistent manner between the images and of which will potentially be comets or asteroids. Mover detections are presented in the form of an animated image that is cropped and enlarged to make it easy to verify by eye (an example is shown at the right). Manual verification by eye is still necessary as most of the detections are found to be spurious, but it is still much quicker than checking the entire image by eye.

Returning to Comet C/2014 Q2, it was first detected by software as a mover in one of 280 fields imaged from that morning. At first it appeared to be a run of the mill 15<sup>th</sup> magnitude asteroid, however, its location so far from the ecliptic made this dubious and this prompted me to look at it in more detail. So I applied the usual checks to ensure that the suspect was not spurious, e.g. a hot pixel in the camera or an optical reflection. Once the object was confirmed to be of celestial nature a quick check was done using the Minor Planet Centres' Checker tool, but this revealed no known minor planet at position. Since an un-discovered asteroid of this brightness was extremely unlikely I was quite sure at this point I had a new – but small and condensed comet.



### **Possible mover 82**

Centred on 470.01,339.197

First frame: D:/working/out/stage3/prematch190\_r1.png

Second frame: D:/working/out/stage3/prematch190\_r2.png

Third frame D:/working/out/stage3/prematch190\_r3.png

[Next Detection](#)

*The detection frame of comet*

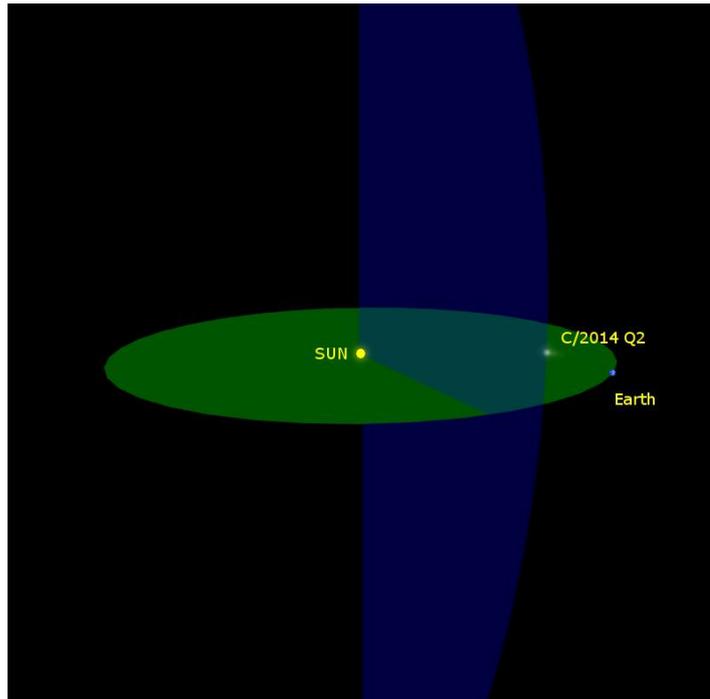
However, before reporting a new find I decided to wait until I had confirmation images the next morning. So rising early Aug 18<sup>th</sup> I was greeted with excellent conditions and at 3:40am local time began to take a series of 20 second exposures with the camera running in un-binned mode to improve resolution. The object was quickly found near the expected position and after a number of images the expected motion was also observed. Furthermore, close inspection revealed a small but

definite coma and a slight tail. Now I was fully confident this was a new comet and it was time to send a report to the Minor Planet Centre!

After sending an email to the Minor Planet Centre, I also contacted Andres Chapman in Argentina who had clear skies and was in a position to image the comet. Andres and I conversed via Facebook as I travelled home on the train and his confirmation images came through only minutes before my train stop! Even after 5 comet discoveries it is still a great thrill to find a new comet, and I am really happy to have shared this moment with Andres! By this time other South American observers were also confirming the comet after seeing it listed on the "Possible Comet Confirmation Page

Usually it takes a while to confirm a new comet, as a sufficient observing arc needs to be made to allow a calculation of an orbit. In this case an official announcement was quite prompt, appearing on August 19 in CBET 3934, with comet Announced as C/2014 Q2.

The prospects for the comet are that it should brighten steadily, reaching visual range in small telescopes in early December (if not earlier). Although it never gets close to the sun, getting only slightly closer than Mars gets, it will be favourably positioned for viewing from earth in January and will be perhaps magnitude 8 at its brightest and well placed in the sky from both hemispheres. As the year progresses the fading comet will march to towards the north celestial pole, which it passes within 1 degree at the end of May, 2015.



*Orbit diagram - Comet C/2014 Q2 at perihelion*

Terry Lovejoy