How to Observe Quasars

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Abstract

Quasars are very distant quasi-stellar objects that appear like stars, thus their name. They may all be active galaxy cores. Only a few are visible and identifiable to amateur astronomers, even though very expensive professional instruments can detect large numbers. These weird deep sky objects can be formidable for amateurs to both see and identify, but the quest is uniquely rewarding. Here is a brief introduction from somebody who has done it.

Have you ever seen with your naked eye light in a telescope arriving from something that is a half-billion years older than our solar system? There are free bright-dot images from professional instruments. Others in the amateur community have captured images of quasars with their own CCD chips – even if they cannot thereby identify which faint pinpoint of light is a quasar. None of these fancy tools provides the existential joy of having photons directly hit our retinas from identified quasars. Thus the quest.

To provide some context, here is a link for what are quasars.

If you are jaded by craters on the Moon, you might be ready to go deep-sky fishing alone for elusive quasars. Just like fishing for fish, there are tools and techniques you will need:

The key tool, of course, is a capable telescope of sufficient size to capture enough photons for your retina. We are only talking about five or less potential quasar targets out of the millions of quasars targetable by the finest and most expensive professional instruments. We are looking for direct personal encounters not mediated by swarming CCD images. That's where the fun lies.

In 2005 I found a very special quasar five billion light years away with my 16" tracking Dobsonian reflector. Generally, one or two quasars can be found with a decent 10" or 12" telescope, but neither target is a half-billion years older than our Sun.

It is imperative that you also go "quasar hunting" only under the darkest stable-sky conditions, when the relative humidity is low. My target quasar is located in Eridanus, not far from Orion, so it is best seen in the winter when humidity is low. My dark skies viewing site is located at altitude in a rural area of the Blue Ridge Parkway. You don't need to flee to the darkest regions of Nevada, just get away from urban lights, and the moon.

I present just below some links of technical value. Beyond their critical data, you will need to set up your field equipment with the expectation of next staying at the eyepiece for an hour or more. That's after you have done your homework.

It is not enough to get your target in the eyepiece. You will need to spend about a half-hour verifying it with printed star maps, and Digital Sky Survey (DSS) images at different fields of view resolutions. For the finest educational and existential field experience, use only your sky visualizations and star hopping, not go-to or point-to. Everything in life doesn't have to skew lazy.

Note that sky charts come with different orientations. What's "normal" with binoculars is wrong for some scopes with N & S reversed. Newtonian light buckets have both N & S and E & W reversed, i.e., the 12 o'clock is South, and the 9 o'clock is West. Some sky mapping programs allow you to adjust orientations. Finally, print your proper maps for use in the field.

Your key task is isolating the particular dim speck you seek from the swarm of other dim specks of very similar magnitude. All pinpoints at dim magnitude appear without color to our eyes, which adds another layer of "fun" to the quest. If you have a sufficiently large light bucket, *and* quality maps plus DSS images *in your hand*, with a dim red flashlight, you will soon be able to visualize *ad hoc* asterisms associated with the target quasar.

Then repeat your zeroing-in activity at least twice more to be sure you have visually captured your object. I spent a half-hour on this last step alone.

Finally, spend a few minutes just staring at the ancient flow of photons from that one pinpoint that is older than our star and Earth. That's the essence of amateur astronomer treasure!

Here are three field resources to help you get started:

An excellent guide.

Excellent too, with proper DSS image.

Slide show including this quasar.

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