

Re: Eyepiece Question

Source: <http://sci.tech--archive.net/Archive/sci.astro.amateur/2007-01/msg00016.html>

- *From:* "Matthew Ota" <otakenji@xxxxxxxxxxxxxx>
 - *Date:* 31 Dec 2006 20:05:20 -0800
-

Viewing planets at high magnification is always a crapshoot. I looked at Saturn two nights ago with my 10 inch SCT, but the seeing was poor and I could not split the Cassini Division.

There are many considerations when viewing planets with a telescope. They are best seen when nearest the zenith, where you are observing then through a smaller column of air.

They are also best seen when at opposition, when they are closest to the Earth.

A good book to read about this is "The Planet Observer's Handbook", by Fred W. Price, Cambridge press. ISBN 0 521 78981 8 paperback. There is an explanation about seeing conditions and how they effect planetary observing.

Matthew Ota

vinylanach@xxxxxxx wrote:

Kickin' Ass and Takin' Names wrote:

vinylanach@xxxxxxx wrote:

I bought a Meade ETX telescope last year for my kids and myself. A few weeks ago, I purchased a 9.7mm Super Plossl eyepiece on e-bay to replace the 26mm one supplied with the ETX. Basically, I just wanted a better view of the planets.

I received it a few days ago, and while certain things are certainly larger, such as the moon, I find that some objects, such as Saturn and Mercury, are distinctly fuzzy and grainy. So I'm trying to figure out why I can't get the same clarity as I get with the 26mm eyepiece. Is

Re: Eyepiece Question

the 9.7mm eyepiece too much for the ETX? Are atmospheric conditions the problem? Or is there a chance that the eyepiece is defective?

Thanks in advance.

There are several reasons why these objects are fuzzy and grainy.

First, let's review some math.

Maximum magnification

The maximum magnification you can expect from a telescope equals (aperture in inches) X 60. Some folks use (aperture in inches) X 50. Whatever.

You don't tell us which ETX you have so I'm just guessing. The ETX-80 has an aperture of 3.15 inches; ETX-90 is 3.5 inches and ETX-125 is 5 inches. Applying the factor of 60 would yield the following maximum magnification figures:

ETX-80: $3.15 \times 60 = 180X$

ETX-90 = 210X

ETX-125 = 300X

This is something I've tried to find out on my own. The box, the owner's manual and the telescope itself say nothing other than ETX. I finally dug up the receipt just now, and it says ETX-90.

Eyepiece magnification

The magnification provided by an eyepiece equals (telescope focal length) divided by (eyepiece focal length). The focal lengths for the ETX scopes are: ETX-80, 400MM; ETX-90, 1250MM. With a 9.7 mm eyepiece, your magnifications would be:

ETX-80: $400\text{mm} \div 9.7\text{mm} = 41X$

ETX-90: $1250\text{mm} \div 9.7\text{mm} = 129X$

ETX-125: $1500\text{mm} \div 9.7\text{mm} = 196X$

Now, what does this tell us? If the eyepiece is yielding a magnification that is close to or more than your scope's maximum magnification, that could cause fuzzy seeing because you are pushing the scope to its optical limits. HOWEVER — we see that this is not the situation here — for example, the ETX-90 has a maximum mag of 210X while the 9.7mm eyepiece gives a 129X magnification, well within the scope's capabilities.

So, your problem is not caused by too much magnification. Here are some possibilities.

Re: Eyepiece Question

1. Not focused correctly. I suspect when you put the eyepiece into the scope you insert the eyepiece barrel all the way into the eyepiece holder. It could be that the eyepiece needs to be pulled slightly out of the holder because the travel of the focuser is not quite enough to focus with that eyepiece. So — insert the eyepiece into the scope so that about 1/3 of the silver barrel is sticking out of the eyepiece holder and try to focus the scope.

I just tried this, and it didn't make a difference. In either position, the eyepiece is able to focus on the moon. It's when I tried to look at Mercury and Saturn last night that it just wouldn't focus well enough. My 26mm did just fine. Mercury and Saturn, of course, were closer to the horizon, which makes me think that it is an issue with the atmosphere. I do live in LA, which probably explains everything.

In this same vein, are you certain you are focussing the scope? The ETX scopes use that tiny little silver knob that's impossible to grip and you may not be focussing the scope — can you focus other objects such as stars, or, can you focus on terrestrial objects — that is, point the scope at a hilltop several miles away and make certain you can focus.

Like I said, I could focus on the moon just as well with the 26mm eyepiece. Most of the brighter stars I focused on were just more indistinct and fuzzier no matter where they were in the sky.

As a former ETX-90 owner, I recommend you replace the stock focussing knob with a Flexi-Focus — several dealers sell them — do a google search for "ETX flexi-focus" or "ETX accessories." Here is an example:

http://www.shutan.com/Merchant2/merchant.mv?Screen=PROD&Store_Code=1&Product_Code=595

Since I've finally figured out that it is indeed an ETX-90, this sounds like a great idea. I've always been a little disappointed with the stock knob.

2. Seeing conditions. Atmospheric conditions control what you see. The sky may appear to the naked eye to be clear when, in fact, it's anything but. It doesn't take much in the way of haze, light pollution, or humidity to cause objects to look fuzzy.

Re: Eyepiece Question

I think this is it.

If you are focussing correctly, try viewing over a period of several nights. Wait for a cold front to move through and clear out the air.

I'll try this, too.

3. You may have a bad eyepiece. Can you focus on other objects, both celestial and terrestrial?

Yes and yes.

Thanks for the very thorough answer to my question!