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Sky-Watcher USA

120-mm ProED Doublet APO Refractor



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Cover Story: Pages 35-39

The cover of this issue features Sky-Watcher's new 120-mm ProED Doublet Apo refractor with Schott BK-7 and FPL-53 lens elements that combine to produce a native focal length of 900 mm (f/7.5). Dr. James Dire's feature report on the ProED 120 tested the scope in both visual and photographic modes and declares it excellent overall. Dr. Dire captured the background image of a 16-day-old Moon using a Canon T3i at prime focus. He absolutely nailed focus and there is simply no false color evident in the 1/1000-second exposure, ample testament to the quality of the ProED 120's objective and of its two-speed Crayford focuser.



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Dr. James Dire has an M.S. degree in physics from the University of Central Florida and M.A. and Ph.D. degrees from The Johns Hopkins University, both in planetary science. He has been a professor of physics and astronomy at several colleges and universities. Currently he is the Vice Chancellor for Academic Affairs at Kauai Community College in Hawaii. He has played a key role in several observatory projects including the Powell Observatory in Louisburg, KS, which houses a 30-inch (0.75-m) Newtonian; the Naval Academy observatory with an 8-inch (0.20-m) Alvin Clark refractor; and he built the Coast Guard Academy Astronomical Observatory in Stonington, CT, which houses a 20 inch (0.51-m) Ritchey-Chrétien Cassegrain telescope.



Austin Grant, a high-school Chemistry and Biology teacher, is a self-described perpetual hobbyist, experienced in such areas as building computers and repairing arcade equipment. Austin stumbled into astronomy several years ago and it soon became his primary interest. Being a child of the digital age, it didn't take long for him to find digital astro-imaging and he sold his last pinball machine to fund his current imaging rig. Austin shares his passion for stargazing with his students and is in the process of building a school astronomy club.

Dragan Nikin, a police officer by day, is an amateur astronomer living in Chicago. A true deep sky hound, he observes in far western Illinois with Toto, his 25-inch f/5 Obsession. Dragan also produces the popular Hooded Observing Vest as well as co-creating www.deepskyforum.com, the Internet's only deepsky devoted forum.



"Uncle" Rod Mollise, despite a demanding day job as an engineer with an aerospace firm, still finds time to teach astronomy to undergraduates at the University of South Alabama, write books and magazine articles about astronomy, and observe.

George Pentsas was born in Thessaloniki, Greece and raised in the north eastern city of Xanthi. Although he didn't get to own a telescope (or the experience of looking through one), it always fascinated him. It was during his college years in Scotland where he stumbled upon astronomy magazines and found out that it is possible to build his own telescope. He had the luck of being advised by a professor that that helped him make his own mirror and never looked back.



Stephen Ramsden is the Executive Director and founder of the nation's largest privately funded solar astronomy outreach program-The Charlie Bates Solar Astronomy Project in Atlanta, GA. The program has hosts a number of outreach events in the US every year and he routinely speaks and displays solar scopes at major events around the country. For further information or to contact Stephen please see www.charliebates.org.

Keith Venables, although graduating in astrophysics, has since worked in defense for 35 years. With his children grown up, he is enjoying getting back into the subject and applying his engineering skills making telescopes and accessories. He is a strong supporter of star parties and has attended the TSP for 15 consecutive years. Something about escaping the dreadful wet and cloudy English weather! More about Keith can be found at www.astrokeith.com.



Mark Zaslove is a two-time Emmy Award winner and recipient of the coveted Humanitas Prize. Mark is a born-again astro noobie, who once had an Optical Craftsman scope as a kid, and is now recapturing his youthful enthusiasm (with a digital twist) and having a lovely time doing it.

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Sky-Watcher USA 120-mm ProED Doublet APO Refractor

By James R. Dire, Ph.D.

I recently had the opportunity to review the Sky-Watcher USA new line of ED doublet Apo refractors. There are three aperture sizes in this series, 80-mm, 100-mm and 120-mm. In this article, I will concentrate on the 120-mm telescope and will cover the two smaller refractors in my next article.

As their name implies, the Sky-Watcher ProED refractors come with doublet (two pieces of glass) objectives. They utilize the finest extra-low dispersion (ED) glass available, Schott BK-7 (front element) and FPL-53. This results in the best color correction for a doublet refractor, virtually eliminating chromatic aberration. As their website advertises, the Sky-Watcher ProED refractors are “for the discriminating amateur astronomer looking for an investment in advanced instrumentation for exceptional viewing.” Exceptional viewing is indeed what these telescopes provide!

The telescopes all arrived simultaneously; each packed in a thick cardboard box. Inside each box was an aluminum carrying case containing a telescope and an enormous quantity of accessories. **Image 1** shows the three cases with the



Image 1 - The William Optics GTF102 is shown mounted next to the GTF81 on which Dr. Dire previously reported.

great Sky-Watcher logo on the covers. The ProED 120mm has the largest case measuring 40 inches by 12 inches by 9 inches. Don't plan on transporting too many kids

in the backseat with this baby. The case has four sturdy locking latches and reinforced corners.

What's in the case is equally impres-

SKY-WATCHER USA 120-MM PROED DOUBLET APO REFRACTOR



Image 2 - The ProED120 ships complete with an 8x50 image-erect finderscope and bracket, a dielectric 90-degree diagonal with a 2-inch compression ring clamp, and 2-inch to 1.25-inch adapter.

sive. Unlike most high-end amateur refractors on the market today, the Sky-Watcher ProED telescopes come with all

of the accessories for observing, other than a mount (**Image 2**). Besides the telescope of course, the case contains an 8x50

image-erect finderscope with mounting bracket and a dielectric 90-degree diagonal with a 2-inch compression-ring clamp. The diagonal comes with a 2-inch to 1.25-inch adapter, also with a compression-ring clamp. The diagonal and the adapter are threaded on the inside to accept 2-inch filters. Sky-Watcher also supplied two optional accessories for this review, a Canon EOS T-ring and a 0.85 reducer/corrector for this review, but these two accessories are not included with the standard ProED 120 kit. With the visual back removed, the reducer/corrector screws on the end of the focuser. There is a second 2-inch to 1.25-inch adapter with different sized threads tapped on the inside and outside. I am not quite sure their function, as I have never used anything with this thread size.

If this were not enough, the telescope has a pair of quick-release metal tube rings and a Vixen-style dovetail plate already attached to the optical tube assembly (OTA), ready to lift out of the case and

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clamp onto a German equatorial mount. The dovetail plate and rings are prepositioned on the OTA in the case at just the right spot for perfect balance once the diagonal and finderscope are attached to the OTA.

There are also two eyepieces in the case with focal lengths 20-mm (45x) and 5-mm (180x). The 20-mm has no markings on it except for a small paper sticker saying "20-mm multi coated." It has a nice rubber coated grip, good eye relief and is probably a generic Plossl eyepiece. It performs like a generic Plossl eyepiece. However, the 5-mm eyepiece really impressed me. It was etched "Sky-Watcher 1.25" -5mm UWA 58°." This eyepiece was larger than the 20-mm, had the same diameter exit pupil, and performed about as well as one of my other, much higher end, 5-mm eyepieces.

The ProED optical tubes are beautifully crafted. The tubes are black with gold speckles. The dew shield, focuser, finder brackets, and tube rings are eggshell white (Image 3). The objective lens assembly is baffled and the interior of the tube painted flat black to keep stray light from reaching the eyepiece. A mounting base for the finderscope bracket is cast right onto the focuser assembly (Image 4). The bracket just slides in from the rear and held in place with a single locking screw. The dew shield does not retract, which accounts for the length of the case.

The OTA comes with a two-speed Crayford focuser (Image 5). The focuser operates smoothly, but the feel is not



Image 3 - The ProED120 OTA features a black tube with gold speckles. The dew shield, focuser, finder brackets, and tube rings are eggshell white.

high-end like the Feather Touch and MoonLite focusers I have on my own telescopes. A set screw on the bottom of the focuser locks the position of the focus tube. The left side has a course-focusing knob, while the right side contains a course knob and the fine focus knob. The telescope comes with a cover for the right knob set. The focuser will absolutely not turn with the cover in place. With the diagonal attached, eyepieces come to focus with the focuser barely cranked out. The focuser has enough travel to focus eyepieces or a camera without the diagonal in place, unlike some refractors I have used that required extensions.

I used the ProED120 mounted on a Celestron CGE Pro German equatorial mount (Image 6). I first aligned the finderscope with the telescope and then did a two-star alignment with the mount and

added three additional calibration stars. This allowed the mount's GOTO software to drive to and center in the eyepiece

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SKY-WATCHER USA 120-MM PROED DOUBLET APO REFRACTOR



Image 4 - A mounting base for the finderscope bracket is cast into the focuser assembly



Image 5 - The OTA comes with a two-speed Crayford focuser.

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any object I desired. While this mount is way overkill for this 11.3 pound OTA, it certainly made first light fun! Instead of a \$4999 CGE Pro, for visual use I'd recommend a Celestron Advanced VX mount which lists for under \$800. It operates the same as the CGE Pro, which was designed for a much larger payload.

The views through the ProED 120 were outstanding. There was no hint of any false color around Venus or any bright stars. I did notice a green ring around the 16-day old moon with the 20-mm eyepiece. I suspected it was the eyepiece, not the telescope. I swapped out the eyepiece with my 26-mm Tele Vue Nagler and the green color was no longer present. The views of the Moon were outstanding. The detail was about the best I have seen in any telescope smaller than 6 inches.

The 120-mm aperture collects 44-percent more light than a 100-mm refractor. This was quite noticeable when I pointed it at globular star clusters M22 and M13, and open star clusters M11, NGC884 and 889. All of these star clusters were stunning in the ProED120. The view of M11 was almost three-dimensional! The Lagoon and Trifid nebulae were excellent in this telescope, too.

With my 82-degree Tele Vue Nagler, the Andromeda galaxy and its two satellite galaxies, M32 and M110, were all visible in the same field. With the dark skies and excellent seeing we have on Kauai, the spiral structure in M31 was very apparent and impressive.

The only distraction from the superb views was the location of the finderscope (Image 4). In many orientations of the German equatorial mount, I found the finderscope was too close to the eyepiece and my head ran into it whenever I looked through the telescope. Angling the finder eyepiece away from the focuser helped a little, but it did not eliminate the problem. I would prefer to have the finderscope farther away, mounted on one of the tube rings!

Image 7 shows the excelled detail visible in this telescope. This picture of the

SKY-WATCHER USA 120-MM PROED DOUBLET APO REFRACTOR



Image 6 - The ProED120 is shown mounted on a Celestron CGE Pro German equatorial mount.



Image 7 - This image of a 16-day-old Moon was taken at prime focus with a Canon T3i camera. The exposure was 1/1000s.

16-day-old Moon was taken prime focus with a Canon T3i camera. The exposure was 1/1000s. Note the sharp crater detail on the limb from the 10 o'clock to 3 o'clock positions.

While the ProED Apo was designed for visual use, it is possible to capture CCD images using this telescope. With other doublet refractors, I have had success imaging through color filters. **Image 8** shows the Dumbbell Nebula (M27) taken with a SBIG ST-10 CCD camera with the 16-day old Moon looming overhead. The exposure was 5 minutes each through red, green and blue filters.

Overall the ProED 120mm Doublet Apo is an excellent telescope. Its strengths are the excellent optics and the plethora of accessories included with the OTA, especially the aluminum carrying case! The cons are the focuser and location of the finderscope, although the focuser is quite sufficient for visual use. Overall, the views through this 4.7 inch refractor make the Skywatcher-USA ProED Doublet Apo a winner! 



Image 8 - Shows the Dumbbell Nebula (M27) taken with a SBIG ST-10 CCD camera with the 16-day old Moon looming overhead. The exposure was 5 minutes each through red, green and blue filters.