

Our 11th annual STAR PRODUCTS

by Phil Harrington

This year marks the 11th time we have examined the universe of astronomical products to find some of the best telescopes, binoculars, and accessories available. Whether you are a veteran observer or a brand-new stargazer, you'll doubtlessly find items of interest in our 2021 Star Products. Enjoy our preview of these 35 outstanding entries, presented in alphabetical order by manufacturer.

Phil Harrington is a contributing editor of Astronomy as well as a dedicated equipment collector.

1 APM HDC XWA 13mm eyepiece

From Saarbrücken, Germany, comes APM Telescopes' new 13mm "x-treme" wide-angle eyepiece. With nine fully multicoated lens elements set in six groups, fully blackened lens edges and spacers, 13mm eye relief, and a cavernous 100° apparent field of view, the HDC XWA will whisk viewers away on a true star trek. The skirted barrel is designed to fit both 1.25" and 2" focusers.

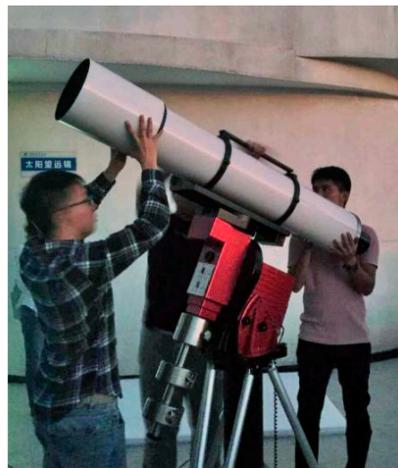
269,00 euros • apm-telescopes.de



2 APM-203 triplet APO refractor

Boasting multicoated, triplet air gap ED APO lenses, the new 8-inch APM-203 f/7 promises images of the Moon, planets, and deep-sky objects that are high in contrast and free of chromatic aberration. The design is just as adept for visual observing as it is for photography, thanks to the standard 2.7" focuser, which makes it easy to attach camera adapters as well as stepdown adapters for star diagonals and eyepieces. The sleek white aluminum tube comes with rotatable tube rings and a Losmandy-style dovetail mounting plate. All this fits into an included aluminum carrying case. Optional upgrades include a Starlight Instruments 3.5" Feather Touch focuser and a carbon-fiber tube.

23,900 euros • apm-telescopes.de



3 Armstrong Metalcrafts Miniature Inner Planet Orrery

Where art meets science: Armstrong Metalcrafts produces some amazingly intricate mechanical devices, including this orrery of the inner solar system. An orrery is a mechanical model that demonstrates the relative positions and motions of the planets orbiting our Sun. This miniature system, measuring just 4 inches (10 centimeters) across, puts the planets in the palm of your hand. A simple turn of a knob on the bottom will make to-scale models of Mercury, Venus, Earth, and Mars orbit around the Sun, and the Moon orbit around Earth. Underneath, an ecliptic plate displays the months, along with the zodiacal constellations and symbols.

\$495 • armstrongmetalcrafts.com



5 Blandin Technical EQT-150SC equatorial platform

Equatorial platforms smoothly move a Dobsonian telescope in time with the sky. Blandin Technical's Crossbow EQT-150SC equatorial platform weighs as little as 14 pounds (6.4 kilograms) and can support telescopes weighing up to 225 pounds (102 kg). Secure it to the base of the Dob and it will track the sky effortlessly for up to an hour before the platform needs resetting. Amazingly, it runs on just two AAA batteries that are stated to last 15+ hours.

\$1,250 •

blandinequatorialplatforms.com



4 Atik Cameras Apx60 CMOS camera

From Norwich, England, Atik is known for producing exceptional astrocameras. Their latest and most advanced is the Apx60, which features Sony's monochromatic IMX455 full-frame CMOS sensor, ideal for large-format, wide-field imaging. The sensor has 61.17 megapixels at 3.76 microns each. The camera's design promises low noise and efficient cooling for prolonged, continuous exposures. The cylindrical Apx60 weighs just 2.2 pounds (1 kilogram) and measures 3.5 by 6 inches (89 by 152 millimeters).

\$4,400* • atik-cameras.com



*Preproduction price; sales price subject to change

6 BuckeyeStargazer desiccant caps

You should never put away a damp telescope, as any moisture can leave water stains on optics and damage delicate coatings. BuckeyeStargazer's desiccant caps offer a simple solution to the problem: Each cap comes with a water-absorbing pack that can be easily recharged in a microwave oven. They are available in several versions that fit into 1.25" and 2" focusers and feature an O-ring to better seal any gaps. Custom sizes are also available upon request.

\$23 (1.25"); \$26-\$30 (2") •

buckeystargazer.net



7 Celestron NexImage Burst Color imager

If you marvel at spectacular images of the solar system in every issue of Astronomy and would like to try your hand at taking your own without spending a fortune, the NexImage Burst Color by Celestron is a good introductory imager. The compact Burst Color weighs only 2 ounces (57 grams), so certainly will not adversely affect the balance of a telescope. Inside, Aptina's 1.2-megapixel AR0132 CMOS imaging sensor can capture over 120 frames per second when subframed or 30 frames per second at full frame. The included software automatically removes frames affected by poor atmospheric conditions, leaving only the sharpest shots.

\$199.95 • celestron.com



8 Celestron Ultima Edge 15mm Flat Field eyepiece



Celestron's revamped line of Ultima eyepieces, now called Ultima Edge, includes five focal lengths ranging from 10mm to 30mm. The 15mm is a nice midrange eyepiece with an apparent field of view measuring 65° and 16mm of eye relief, thanks to its fully multi-coated, eight-element lens design. The black-anodized aluminum barrel fits standard 1.25" focusers and is threaded to accept filters. The housing also includes a molded rubber grip ring for more secure handling, as well as a fold-down rubber eyecup.

\$129.95 • celestron.com

10 DayStar SR-127-QT H-Alpha refractor

Last year, DayStar introduced a new flagship to their line of solar telescopes. The SR-127-QT is a 5-inch f/21 achromatic refractor that is optimized for Hydrogen-alpha (H-α) viewing. Three models are available: One is intended for viewing prominences, a second for observing the chromosphere, and a third can be custom designed for a specific wavelength between 0.2 and 0.8 angstroms. The scope's carbon-fiber tube measures 31.1 inches (79 cm) long with the dew shield retracted. With the standard mount rings, it weighs only 13.6 pounds (6.2 kg). The H-α filter operates on a 12-volt DC current, so it can be powered by a user-supplied portable battery. An optional focal reducer cuts the focal length from 2,667mm to 1,355mm.

\$5,995 (prominence); \$7,995 (chromosphere) • daystarfilters.com



12 Educational Insights GeoSafari Jr. Kidnoculars

The 2x35 non-prismatic Kidnoculars are a great way to introduce the youngest stargazers to binocular viewing. True, the plastic lenses do not produce the quality images we would expect from adult-sized binoculars. But that's not what these are about. Kidnoculars are a teaching tool. Their biggest benefit is helping young children learn how to hold and view through binoculars. The large, soft rubber eyecup is designed to surround the child's eyes completely, while an integrated nose cutout makes it easy to position them perfectly. The low magnification also helps kids aim without a lot of image shake.

\$14.99 • educationalinsights.com



9 CFF Telescopes 135mm APO refractor

Although not as well known in the U.S. as some other brands, CFF Telescopes are highly regarded in Europe, where they are designed and manufactured. The 5.3-inch f/6.7 refractor 135mm features oil-spaced design with a core element of Ohara S-FPL53 glass, famous for its outstanding performance. Images are brought into sharp focus with the included 3.5" dual-speed rack-and-pinion focuser from Starlight Instruments. Other standard features include a removable dew shield, CNC mounting rings and dovetail plate, and a transport case.

6,519 euros • cfftelescopes.eu



11 Dimitrios Kechagias' Polar Scope Align Pro app

While many telescopes feature advanced go-to systems that auto-steer to selected targets, others still require manual navigation. After installing Dimitrios Kechagias' Polar Scope Align Pro app on your iPhone, you can use the phone's digital compass to find dim targets. If you're worried about your compass' calibration, the app's "hop to" function can be used to calibrate the app. You can then use the "push to" function to push your scope toward the target.

\$2.99 • iOS store

13 Explore Scientific BT-120 SF Large Binoculars

Looking for big binoculars? Explore Scientific's BT-120 SF may be just the model you want. The BT-120s feature a pair of 4.7-inch lenses mounted in a magnesium housing that is sealed and filled with nitrogen. At the other end, Porro-prism assemblies are tilted at 45° for more comfortable sky viewing. The BT-120s come equipped with two 20mm eyepieces with 62° apparent fields of view. The eyepieces are interchangeable and may be substituted with any eyepiece pair with a plug-in diameter of 1.25 inches (31.7 mm). The sleek, glossy white tube also includes an integrated handle for easy carrying. A sturdy tripod, sold separately, is highly recommended.

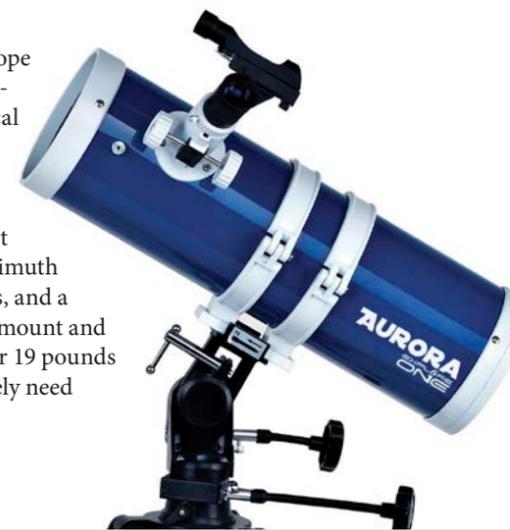
\$2,349.99 • explorescientificusa.com



14 Explore Scientific Explore One Aurora 114mm Reflector Telescope

The 4.5-inch f/4.4 Explore One 114mm Reflector is a great telescope for children and young adults getting into observing. It offers a focal length of 500mm and comes complete with everything a beginner needs, including 20x and 52x Plössl eyepieces, a red dot finder, an easy-to-use altitude-azimuth mount with slow motion controls, and a fully adjustable tripod. With the mount and tripod, this scope weighs just over 19 pounds (8.6 kg), meaning a child will likely need some help moving it.

\$149.99 • explorescientificusa.com



15 Explore Scientific Two-Room Pop-Up Go Observatory Tent

Earlier this year, Explore Scientific introduced their Two-Room Pop-Up Go Observatory Tent, designed to shelter telescopes and observers from stray light, wind, dust, and rain. The tent's pop-up design makes setup simple. Release the storage strap and each side pops up from its pack. Next, connect the two observatory rooms with a Velcro seam, and stake the tent to the ground. Each room measures 5 by 5 by 5 feet (1.5 by 1.5 by 1.5 meters) with wind break walls that stand 6 feet (1.8 m) high. The tent is made of blackout-coated fabric that is both waterproof and offers UV protection. A removable fly is also included for when the tent is not in use or to guard against rain.

\$279.99 • explorescientificusa.com



16 iOptron iGuider autoguiding system

Known for innovative products, iOptron offers the iGuider self-contained autoguiding system, which comprises a 30mm f/4 achromatic guide scope coupled to an iGuider 1 camera. The compact autoguider weighs just 7 ounces (200 g), significantly smaller and lighter than conventional guide scopes. While designed to fit iOptron's CEM26 and GEM28 mounts without an adapter, the iGuider can also mount to any scope with a standard finder scope dovetail base. The camera connects to any computer running ASCOM planetarium software.

\$218 • ioptron.com



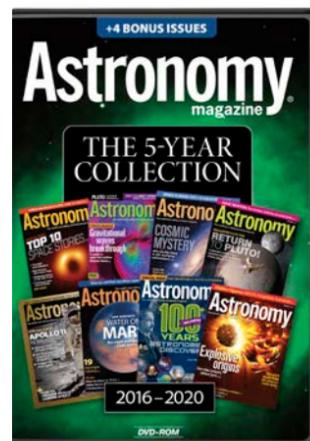
17 LensPen lens cleaner

Whether you use a telescope, binoculars, or a camera, you should have a LensPen nearby to deal with the inevitable smudges that come from touching an optical surface with your finger or eyelashes. Several versions are available. The original full-size LensPen measures 4.3 inches (11 cm) long. At one end is a round cleaning tip that uses a special non-liquid cleaning element that will never dry out. The tip is slightly concave to match the convex shape of most lenses. At the opposite end is a retractable brush for removing dust particles. Both are safe to use on all optical surfaces.

\$12.95 • lenspen.com



19 My Science Shop Astronomy magazine: The 5-Year Collection 2016-2020



It's great to look forward to each monthly issue of *Astronomy* magazine, with its wealth of information and amazing images. Wouldn't it be nice to have them all in one easily searchable

location? Every issue published between 2016 and 2020, including four special issues, is now available on a single DVD that will run only on Windows and Mac computers. There is no better way to relive the 2017 Great American Eclipse, the 50th anniversary of the Apollo 11 Moon landing, the New Horizons Pluto flyby, and the discovery of gravitational waves than with this DVD.

\$29.95 • myscienceshop.com

18 My Science Shop Antique Star Chart Set: The Four Seasons

Collectors of vintage astronomy books will immediately recognize the name Elijah Hinsdale Burritt as the author of the 1835 classic *The Geography of the Heavens*. It was a two-part effort: part text-book and part star atlas. For the latter, he created a set of artistic representations of the entire sky. Now, you can display reproductions of his antique star charts featuring all four Northern Hemisphere seasonal skies. Each chart measures 22½ inches x 21⅝ inches (57.2 cm x 56.7 cm) in size and is suitable for framing.

\$59.99 • myscienceshop.com



20 nPAE Rotating Eyepiece Turret

Switching between eyepieces or between an eyepiece and a camera at night, all while not bumping the aim of a telescope, can be a daunting task. This rotating eyepiece turret from nPAE makes that challenge a thing of the past. Honed from aircraft-grade aluminum and then red-anodized, nPAE's Rotating Eyepiece Turret has three ports for 1.25" eyepieces and another three for 2" eyepieces. The spacing is wide enough to simultaneously accept DSLR cameras and binoviewers. There are also three dedicated slots for 2-inch filters that allow all components attached to the turret to share the same filter.

£995.00 • npae.net



21 Oberwerk PM2 Parallelogram Mount

One of the challenges to observing with two eyes instead of one is holding binoculars — especially giant binoculars — steady enough to enjoy the view. The PM2 Parallelogram Mount from Oberwerk is the perfect way to do just that. Made from maple, stainless steel, and aluminum, the PM2 will hoist binoculars weighing as much as 12 pounds (5.4 kg) skyward, offsetting them from the tripod for easy viewing from horizon to zenith. The binoculars may be raised and lowered effortlessly for sharing the view with others without affecting the aim. You will need to add a substantial tripod to support the PM2, such as Oberwerk's matching TR3 hardwood tripod.

\$629.95 • oberwerk.com



22 Omegon veLOX 287 C Color planetary imager

Designed with planetary, lunar, and solar imaging — as well as autoguiding — in mind, Omegon's veLOX 287 C Color imager packs a lot of features into a small and reasonably priced package. The imager's bronze-anodized aluminum body is shaped like a 1.25" eyepiece, measuring just 2.8 inches (7.1 cm) long and weighing 3.2 ounces (90 g) without the supplied USB cable. On the back are ports for the guiding and USB cables. Inside lies Sony's IMX287 CMOS sensor, with 728x544 pixels. The imager can capture up to 520 images per second at full resolution, and then process them using the supplied AstroPhotoCapture software to generate the sharpest possible results.

\$434 • omegon.eu



23 Orion Right-Angle 1X-2X Viewer for Polar Scopes

If you own a portable German equatorial mount with a built-in polar-alignment scope, then you know what a chore it can be to sight through that scope while aligning the axis with the celestial pole. Your back and neck will appreciate Orion's Right-Angle 1X-2X Viewer for Polar Scopes. The viewer slips over the eyepiece end of any 25mm- to 30mm-diameter polar scope. An internal Amici prism produces the same image orientation as the polar scope, while turning a helical focus ring sharpens the view. After alignment is set initially, slide the magnification setting from 1x to 2x for a closer inspection.

\$119.99 • telescope.com

24 Radian Telescopes Raptor 61 APO refractor

Radian Telescopes recently added to their lineup the Raptor 61, a 2.4-inch f/4.5 apochromatic refractor. Inside the red-accented glossy black tube lies the heart of the Raptor 61, an apochromatic triplet objective made from premium glass. Multicoatings result in sharp, contrasty images free from chromatic aberration and reflections. The telescope comes standard with a sturdy 2.5" dual-speed rack-and-pinion focuser, a filter vault that allows easy swapping of 2-inch filters, a 360° rotator, a padded-insert travel backpack, and unique hexagonal mounting rings for attaching several different accessories simultaneously.

\$999.99 • radiantelescopes.com



25 Rainbow Astro RST-135 Weightless Mount

As the British TV show *Monty Python's Flying Circus* used to say, "And now for something completely different." Although the RST-135 Weightless Mount is not weightless (it weighs 7.3 pounds [3.3 kg]), it is lacking the cumbersome counterweight seen on the lookalike German equatorial mounts. To pull this off, the RST-135 uses a strain-wave gear system to produce a high-ratio gearbox in a compact space. This lets the mount carry payloads up to 30 pounds (13.5 kg) without a counterweight. The RST-135 also includes built-in Wi-Fi and GPS for cordless operation.

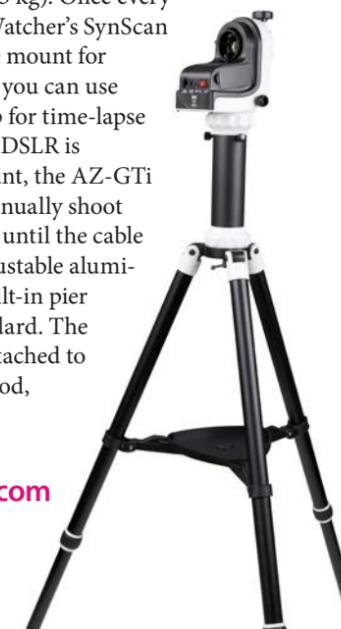
\$3,895 • rainbowastro.com



26 Sky-Watcher AZ-GTi Mount

Designed to be portable, yet include the most wanted features like go-to alignment, built-in Wi-Fi control, and video time-lapse capability, Sky-Watcher's AZ-GTi altitude-azimuth mount is a great choice for short-tubed telescopes weighing up to 11 pounds (5 kg). Once everything is set up, Sky-Watcher's SynScan Pro app can align the mount for celestial tracking. Or you can use the SynScan PTZ app for time-lapse photography. Once a DSLR is plugged into the mount, the AZ-GTi will trigger it to continually shoot 60-second exposures until the cable is unplugged. An adjustable aluminum tripod and a built-in pier extension come standard. The mount can also be attached to nearly any photo tripod, if preferred.

\$400 • skywatcherusa.com





27 ↻ SpicaEyes 16-inch SlipStream Dobsonian

From Equatorial Platforms comes a line of 16-inch and larger SpicaEyes reflectors. The featured 16-inch aperture uses optics crafted by Lightholder Optics, as do the 18- and 20-inch models. The larger apertures use mirrors from Kennedy Optics. All feature aluminum truss optical assemblies perched on Dobsonian-style GoTo SlipStream drive systems. The SlipStream drive includes slip clutches on both axes, letting you move the scope manually or with the wireless hand control. Once a target is in view, the tracking platform keeps the telescope perfectly centered on it.

\$19,500 • equatorialplatforms.com

28 ↻ Stellarvue SVX102D refractor

With a 4-inch f/7 fully multicoated doublet objective made with super low-dispersion and lanthanum elements, the new SVX102D refractor from Stellarvue promises outstanding optical performance. The oversized Feather Touch focuser from Starlight Instruments easily brings images into sharp focus. The glossy white aluminum tube is fully baffled and painted ultraflat black inside to prevent spurious light from slipping in and spoiling the view. A retractable dew shield, CNC-machined mounting rings, and a finder scope dovetail base round out the package.

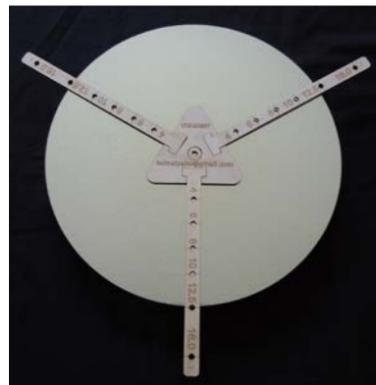
\$1,895 • stellarvue.com



29 ↻ Takahashi Epsilon E-160ED reflector

The 6.3-inch f/3.3 Epsilon E-160ED reflector is the newest member of Takahashi's family of Newtonians designed specifically for astrophotography. The fast optical system consists of a hyperbolic, concave primary mirror and a two-element ED corrector lens to eliminate spherical aberration and coma, which are common image-spoiling aberrations. Together, the optics produce sharp star images across the field, making the Epsilon E-160ED perfect for full-frame sensors. Cameras can be attached directly to the oversized, rotatable focuser. The mount, camera, tripod, and finder are sold separately.

\$3,960 • takahashiamerica.com



30 ↻ Telescope Mirror Alignment Tool

Made of thin Baltic Birch hardwood, the Telescope Mirror Alignment Tool, or Telmat, is an easy way to precisely mark the center of a Newtonian reflector's primary mirror, greatly simplifying collimation. Created by retired optical engineer Bob Schalck and his son Jonathan Schalck, the Telmat fits standard-size mirrors 4 to 16 inches (10 to 40 cm) in diameter. (Larger sizes by request.) Lay the Telmat on the mirror so that the three viewing holes matching its diameter align with the mirror's outside edge. Once everything is lined up, mark the mirror's center with a small dot using an indelible marker, or by inserting a punch-hole reinforcement ring through the Telmat's central hole. Note that you won't be able to Google this company.

\$19.95 • telmatsales@gmail.com

31 ↻ Tele Vue DIOPTRX astigmatism corrector

Those who have astigmatism are usually forced to wear their glasses while observing, preventing them from enjoying the wide fields available with many of today's premium eyepieces. But the creator of many of those premium eyepieces, Tele Vue, has a solution. The fully multicoated DIOPTRX attaches to the top of more than 20 long eye-relief Tele Vue eyepieces. Once in place, the DIOPTRX can be rotated to compensate for the astigmatic axis angle and get the sharpest possible full-field view. Select the diopter that corresponds with the cylinder reading on your eyeglass prescription.

\$105 (0.25-2.50 diopters); \$122 (3-3.50 diopters) • televue.com



33 ↻ Vixen 2.1x42 Constellation Binoculars

Ever want to have super eyes? Ultralow-power wide-field binoculars like Vixen's 2.1x42 Constellation Binoculars are becoming increasingly popular for that reason. These binoculars include five multicoated elements designed to take in 25° of sky in a single view. This means that full constellations fit into the field. The binoculars also increase the visibility of stars by more than a full magnitude over the eye alone, and enhance the contrast of the Milky Way.

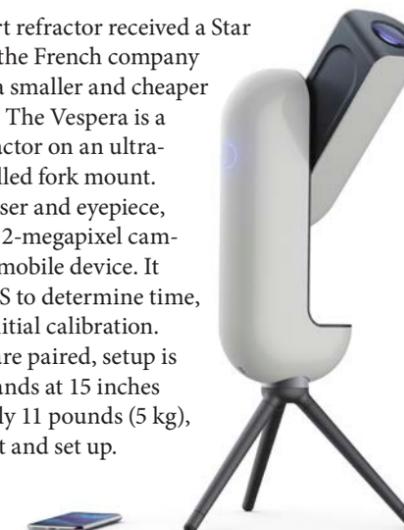
\$450 • vixenoptics.com



32 ↻ Vaonis Vespera smart telescope

Last year, the Stellina smart refractor received a Star Product award. This year, the French company Vaonis is back again with a smaller and cheaper version called the Vespera. The Vespera is a 2-inch f/4 achromatic refractor on an ultra-modern, computer-controlled fork mount. Rather than include a focuser and eyepiece, the Vespera uses a built-in 2-megapixel camera to display images on a mobile device. It uses that same device's GPS to determine time, date, and location for its initial calibration. That means once the two are paired, setup is automatic. The Vespera stands at 15 inches (40 cm) tall and weighs only 11 pounds (5 kg), making it easy to transport and set up.

1,499 euros • vaonis.com



34 ↻ Vixen Polarie U Star Tracker

Vixen has recently released an updated version of their popular Polarie camera tracker. The Polarie U is a compact, self-contained design that — once aligned to the celestial pole using the integrated alignment scope — will effortlessly track a camera across the sky. The companion app allows you to link your smartphone to the Polarie U's motion and camera shutter release. This makes setting up time-lapse and interval photography easy, producing dramatic results.

\$980 • vixenoptics.com



35 ↻ William Optics Fluorostar 91 refractor

If you're in the market for a high-quality apochromatic refractor that is small in size but big in ability, the Fluorostar 91 from William Optics should be on your shortlist. A three-element objective using FPL-53 glass and STM (short for SiO₂/TiO₂/Methyltrimethoxysilane) coatings produces exceptional images for both visual and photographic use. The focuser can accept all leading brands of T-mounts from Canon, Nikon, Sony, Pentax, and more, as well as 2" star diagonals. The retractable dew shield includes a removable lens cover and a clever built-in Bahtinov focusing mask for astrophotography. Other standard accessories include a pair of machined tube rings and handle, a Vixen-style dovetail plate, an extension tube for visual use, and a soft carrying case.

\$1,998 • williamoptics.com

