

Lepus 0.62X Telecompressor

Introduction to the Lepus 0.62x SCT Telecompressor Line.

The Lepus 0.62X is a 4-element telecompressor lens system that has been specifically designed to work with well-corrected Schmidt-Cassegrain telescopes such as the Meade ACF or the Celestron EdgeHD. The Lepus 0.62X has a design back-focus of 100mm on-axis and can fully illuminate a 22mm diagonal CCD chip or CMOS sensor. The Lepus provides good correction out to 28mm making APS-C sized sensors an excellent match.

Lepus Variants

Optec's Lepus telecompressor is available in a variety of packages including the standard 2-inch version designed to fit directly into a TCF or any other 2-inch focuser. Also available are direct thread versions to fit the 2-inch SCT thread common on both Celestron and Meade SCT telescopes as well as a customized version to fit the larger Celestron 3.27" thread for the EdgeHD C9.25, C11, and C14. Specific model numbers are listed below:



- #19407 - Standard 2-inch version Lepus to fit any 2-inch focuser (shown above),
- #19406 - Lepus-ACF version with direct thread connection for Meade ACF telescopes,
- #19409 - Lepus HD for the Celestron 8-inch Edge HD telescope,
- #19414 - Lepus HD for the C9.25, C11, or C14 Edge HD telescope.

Camera Adapters (sold separately)

Each of the variants of the Lepus 0.62X telecompressor share a common OPTEC-2100 dovetail on the camera facing side to receive any of our Lepus or NextGen camera mounts. Newly introduced Universal Camera Mounts set the back-focus distance for any camera having a 55mm depth-to-sensor distance. Our VLC Variable Length Camera Adapters and custom length camera adapters are also available.

Camera adapters are available in M42 T-thread, M48, M54, SCT, and STL 2.156"x24tpi threaded mounts.



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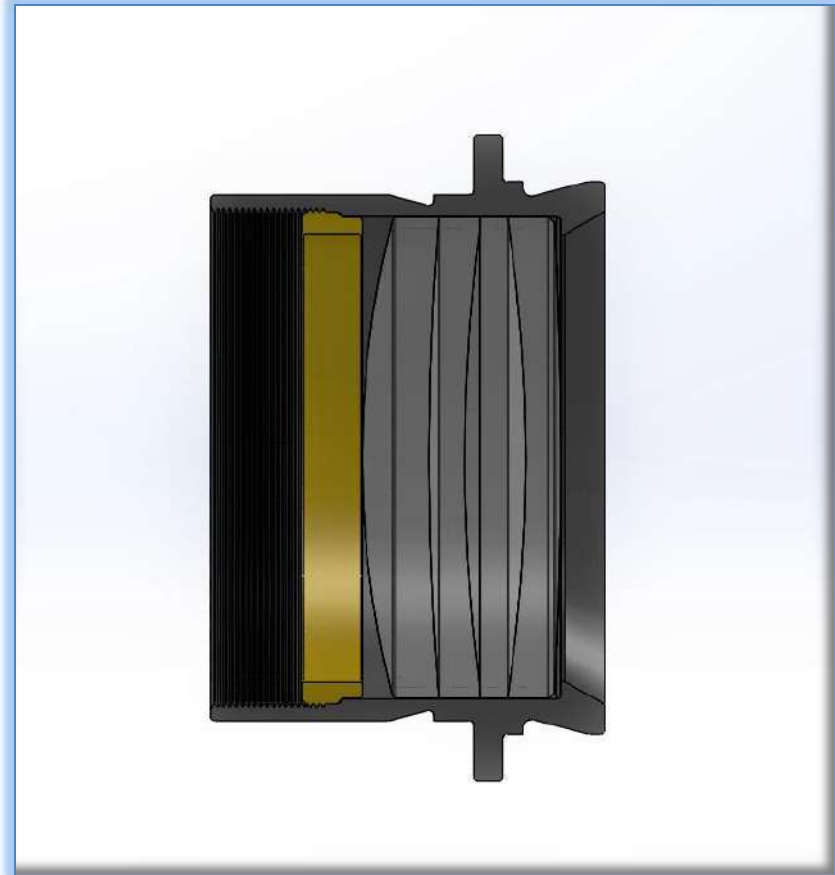
Optical Design

4-Element Dual Doublet Design

Lepus includes a pair of doublet lenses with an air-space that work together reduce the effective focal length of the scope by about $1/3^{\text{rd}}$. The focal reduction provides an effective magnification of 0.62X at the recommended back-focus distance of 100mm on-axis.

Magnification

Note that the Lepus design depends upon an effective de-focus of the primary scope. This is accomplished simply by moving the primary mirror forward with the coarse focus knob. By moving the primary mirror forward you will lengthen the effective focal length of the native scope. Thus, a native f/10 EdgeHD SCT, for example, is working at approximately f/11 with the mirror moved forward when the Lepus and camera are attached and in best focus. Thus, with the Lepus 0.62X magnification at f/11, the optical system will yield an effective focal ratio closer to f/6.8.



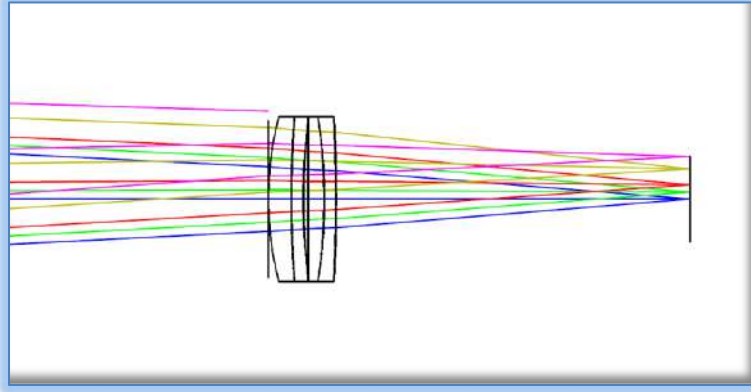
Optical Performance

Lepus was designed using Zemax optical design software which allows the optical engineer to optimize the design by constraining certain functions. With a well-corrected SCT model, we designed the Lepus to provide a generous back-focus distance of 100mm while minimizing the blur spot across the 24mm field.

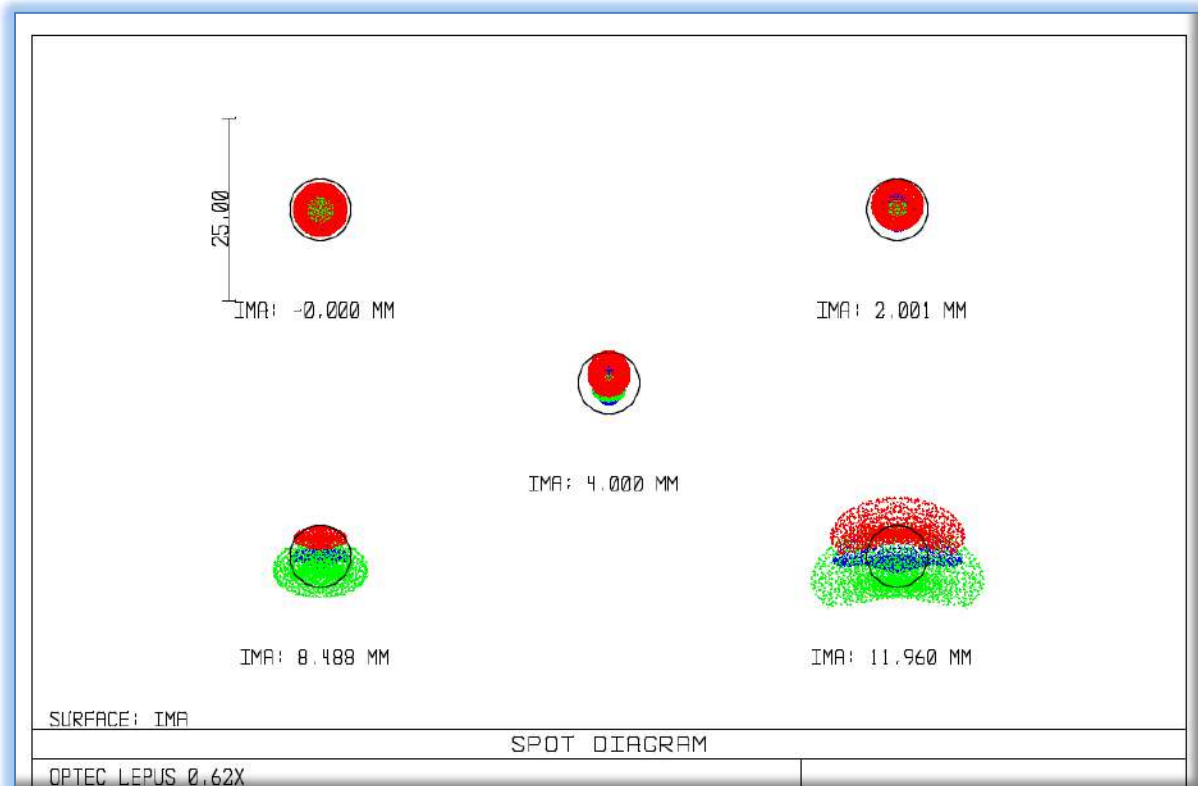


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In the diagram below, the IMA: value represents the radius of the image produced at the focal plane. Thus, at approximately 12mm radius or 24mm diagonal you can see the blur spot is approximately twice the size of the Airy disk (represented by the black circle) for the optical system. On axis (IMA: 0.00 MM) all the star's energy is fully contained within Airy's disk. The scale at left represents 25 microns.

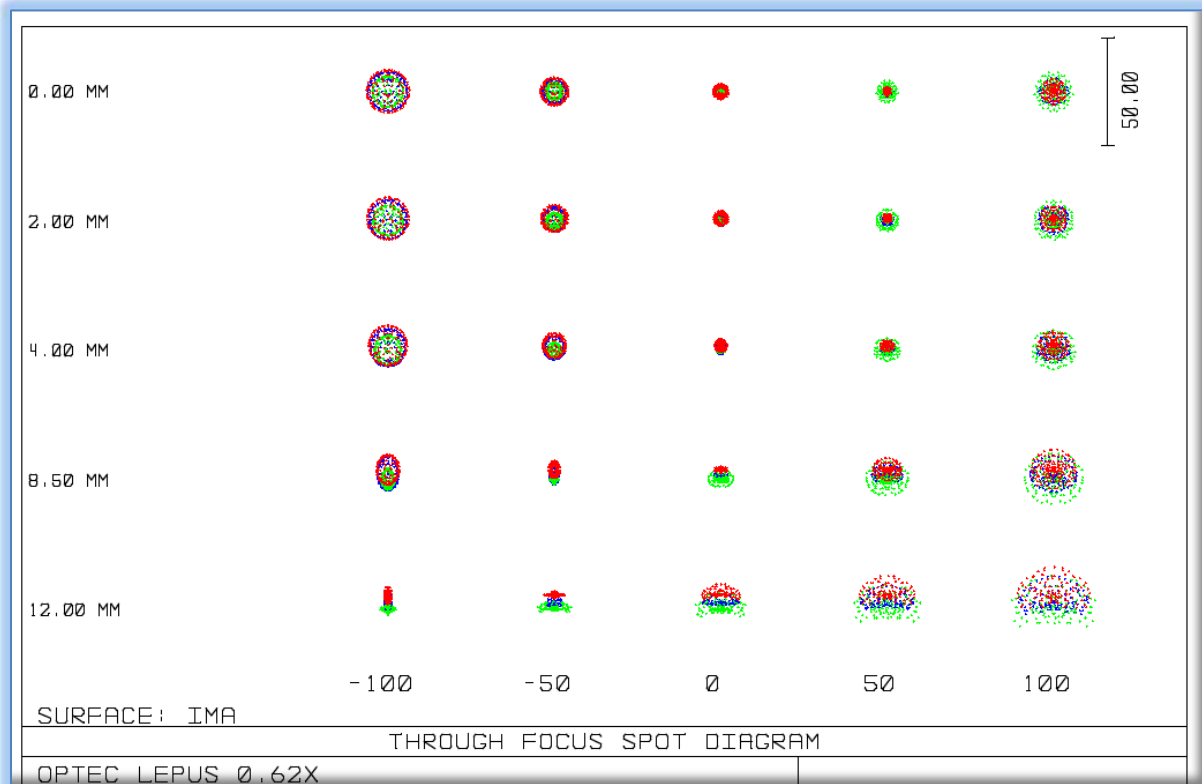


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Through Focus Performance

Interestingly, the through focus diagram below shows how focus is adversely affected by shifts from the ideal focal plane as small as 100 microns or 0.1mm. This is why we strive to place the camera's image plane at exactly the right distance behind the Lepus lens system. See the section on camera mounts below.



Independent Review

A review of the Lepus HD mounted on a Celestron 11-inch EdgeHD telescope was provide in a recent issue of Astronomy Technology Today. The pdf is available here:

https://optec.us/resources/documents/Lepus_0.62X/ATT_38_celestron_edge.pdf



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Schmidt Cassegrain Telescope

The original Schmidt-Cassegrain Telescope (SCT) design was an excellent compromise between portability, large aperture, and a wide focal range. The key to the design was the moving primary mirror which changed the primary / secondary mirror spacing thereby affecting focus at the image plane. The folded optical path allowed a stout telescope package while still featuring a fairly large aperture. The ubiquitous Celestron-8 200mm aperture SCT was arguably the most popular amateur telescope through the 1970's, 80's, and 90's. In the early 1980's Meade introduced their own version of the C-8 as the Meade model 2080. I still own my Meade LX-3 8-inch SCT.

While the SCT provided very good on-axis performance through a long range of focal positions, the off-axis aberrations became problematic as CCD imaging became available to the amateur. Coma and sphero-chromatism were particularly problematic for imager. Optec introduced a line of corrected focal reducers and improved them in the NextGEN series. Our NGM 0.33X focal reducer continues to be a popular option for small sensor cameras and older SCT scopes.

With Meade's introduction of the ACF (Advanced Coma Free) Schmidt-Cassegrain Telescope in the mid-2000's, Celestron quickly followed suit with their corrected SCT known as the Edge HD. While Meade's design improves the 2-sided aspheric corrector plate and hyperbolic secondary mirror, Celestron added field corrector lenses to the original SCT design inserting them into the baffle tube near the exit pupil of the telescope. Celestron produced an excellent White Paper describing their optical design approach and made it available to the general public. We provide a downloadable pdf copy in our download server here:

https://optec.us/resources/documents/Lepus_0.62X/EdgeHD_WhitePaper_FINAL.pdf

While Meade and Celestron used different approaches to correct problems inherent with the original SCT design, both companies produced very well-corrected telescopes in the ACF and EdgeHD. Optec engineers designed a new telecompressor in the Lepus based loosely on the original Baader/Celestron f/6.3 telecompressor which offered no significant coma correction, but only reduction. We improved the design as a two doublet system and optimized for 100mm of back-focus on-axis.

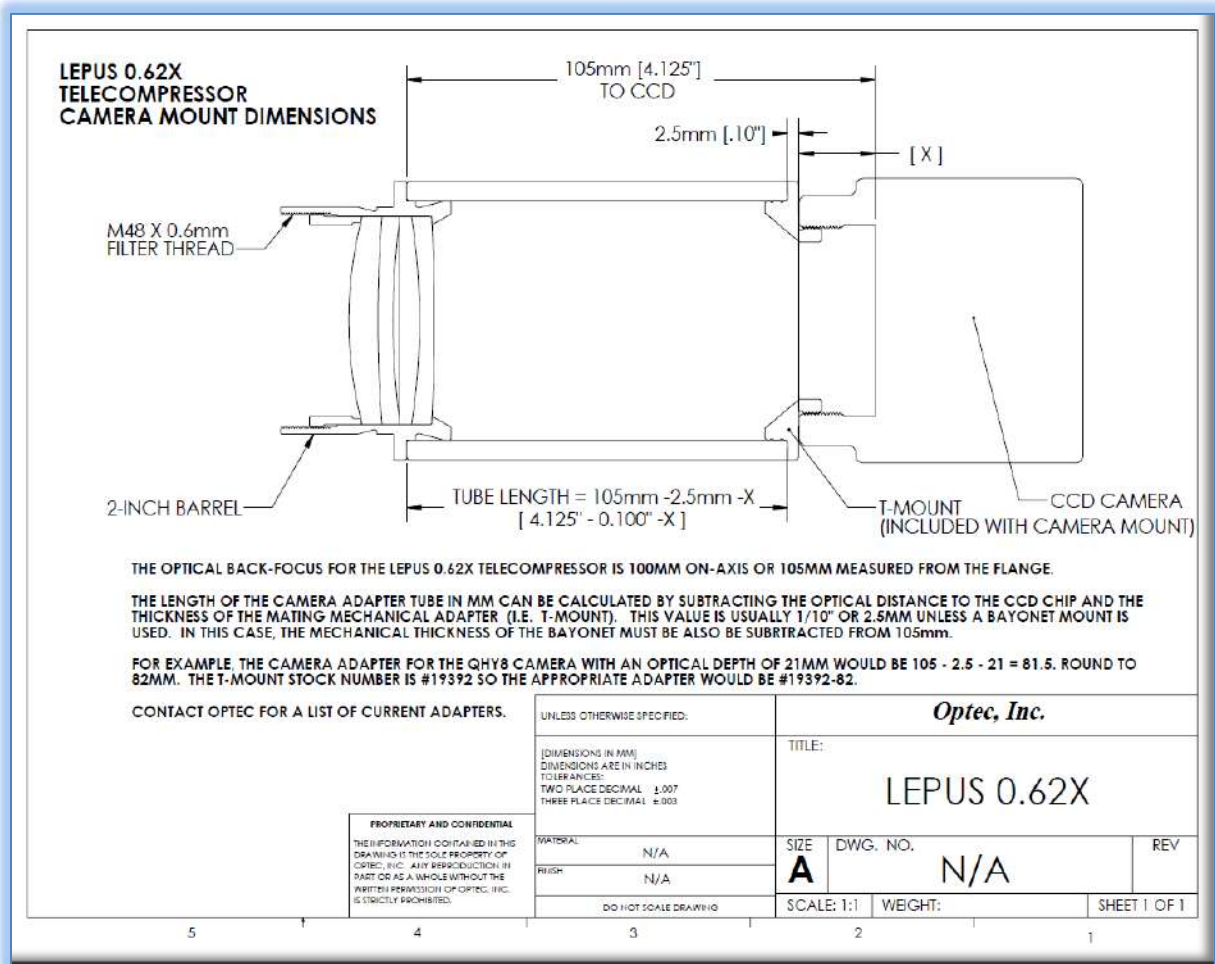
Parfocality Notes



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Back-Focus Considerations



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Telescope Connection

Camera Mounts

Universal Camera Mounts

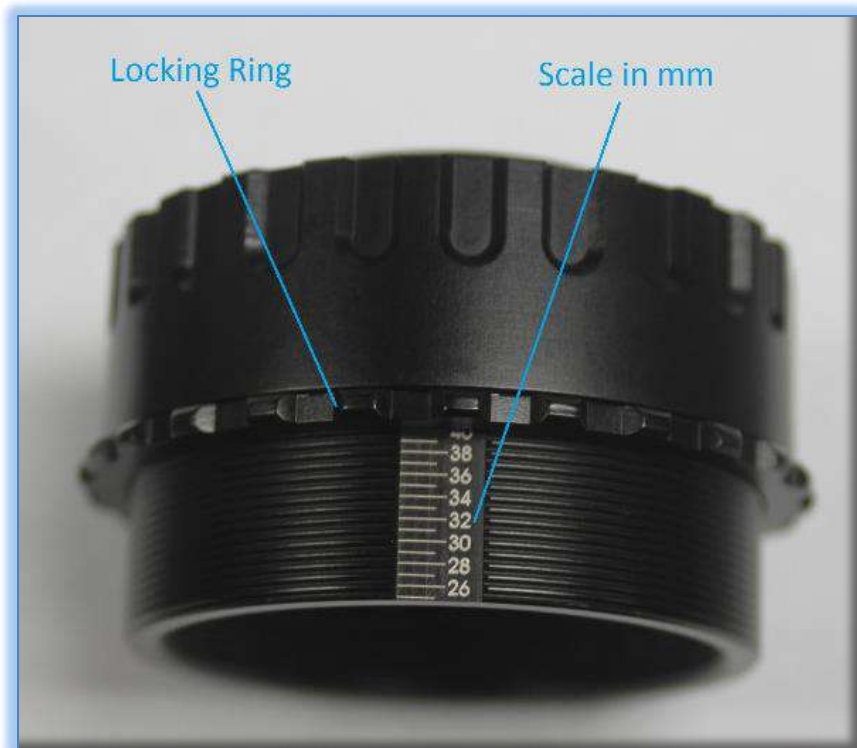
Our Universal Camera mounts are 50mm long and work perfectly with any camera system having a 55mm back-focus distance. This includes most DSLR cameras with T-rings and many import cameras which include adapters to achieve the 55mm depth-to-sensor distance. Like our custom mounts, the Universal camera adapters are available in several different interfaces including M42 T-thread, SCT thread, and STL thread, as well as M48x0.75mm and M54x0.75mm.



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VLC – Variable Length Camera Adapters



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Custom Length Camera Adapters

Finally, we continue to offer custom length camera adapters at reasonable prices for camera packages having back-focus depth-to-sensor distances other than 55mm.

Visit our website or contact Optec for more details if you have not yet purchased a camera mount for your Lepus.



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Installation

Remove protective dust caps. Note the brass screw included on the Lepus telescope-side flange is designed to fit in a notch on the TCF-S and other 2" focuser drawtubes. If your focuser or mating receiver does not have a locator notch, simply remove the brass locating setscrew on the Lepus using a flat-tip screwdriver.

Insert the telescope side barrel of the Lepus (the longer 2-inch O.D. side) into your focuser or 2" receiver and tighten securely. The dovetail on the Lepus barrel will help tighten the flange flush. Lastly attach your Lepus camera mount onto the 2.1" male dovetail on the camera side of the Lepus. Tighten the three setscrews securely on the Lepus camera mount and continue installing the rest of your imaging train.

Contact [Optec Support](#) with any problems or questions regarding the Lepus 0.62X Telecompressor.



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