

Tele Vue Paracorr
Coma Corrector for Newtonians (Visual version)
By David Knisely [click to email author](#)



*Available from various Tele Vue dealers
(suggested retail price: \$300)*

Short focus (i.e.: under $f/6$) Newtonians are quite popular these days, especially when in the form of the large aperture Dobsonians which will often be as short as $f/4$. Unfortunately, one characteristic of these telescopes is the aberration known as "coma" which often elongates stars near the edges of the field into tiny comet-like spots instead of the nice points we would like them to be.

Coma gets noticeably worse as the focal length of the paraboloidal mirror gets shorter (i.e. $f/4$ has more coma than $f/4.5$ mirror), which has often meant that owners of large "fast" Newtonians had to just put up with less than sharp stars in the outer parts of their field of view. Now, Newtonian lovers can get coma under

control with Tele Vue's PARACORR, which eliminates or at least significantly reduces the effects of that aberration.

Description

The Tele Vue PARACORR (short for "paraboloid-corrector") is a set of lenses (two spaced doublets) mounted in a heavy-duty housing that is then placed in a standard 2" focuser ahead of the eyepiece. The eyepiece is then placed into the Paracorr and adjusted slightly in height for best coma-reduction performance in the telescope. Although this corrector will help improve the off-axis performance of almost any short focus Newtonian, it is most effective in the f/ratios from f/3.5 to f/5.0. It also lengthens the focal length of the telescope by about 15 percent, so that an f/4 telescope without the Paracorr becomes an f/4.6 telescope *with* the Paracorr in place.

There are two versions of the Paracorr: one for visual use and the other specifically designed for photography (this review is of the visual version only), but neither will fit in focusers smaller than 2 inches I.D.

The Paracorr itself resembles a large 2 inch Barlow, with the exception of its somewhat fatter upper "tuning" section. Its sturdy black aluminum body is approximately 4.5 inches in length (including the 2" to 1.25" adapter), with a maximum width of 2.75 inches at the tuner segment (exclusive of the thumbscrews). The lenses in the Paracorr are quite large in diameter, which helps prevent vignetting. The Paracorr weighs just over one pound (as much as some 2" eyepieces), which should be taken into account when considering its use on those Dobsonians where balance is critical.



The upper third of the Paracorr consists of the larger "tunable" section which allows for the more precise positioning of an eyepiece to get the best possible correction. With a large curving slot in its side and a large knurled thumbscrew, the height of an eyepiece above the Paracorr can be "fine-tuned" over a length of about half an inch. This can be helpful, as not all eyepieces will have exactly the same point of "best correction". This slot is marked with five bright green tick marks to help the user relocate the point where they know an eyepiece tended to work best at. The bottom (focuser) end of the Paracorr is threaded for standard filters that would go on a 2" eyepiece, so changing eyepieces won't necessarily require changing any filters that are in place.

The Paracorr comes with an 1.25" to 2" eyepiece adapter, and both the adapter and the unit itself use non-captive thumbscrews which bear up against brass sleeve rings to hold the eyepiece in place. These sleeves help prevent marring of the outer surfaces of the eyepieces when being used in the Paracorr. The 1.25" adapter has the usual Tele Vue "safety groove", which can be both a

blessing (keeps things from falling out if the thumbscrews aren't quite tight) as well as a slight inconvenience (sometimes makes you have to "wiggle" things a bit to get them apart).

The interior of the Paracorr is blackened and well-baffled to cut down on scattered light. All optical surfaces appear to be multi-coated, and I noted no flaws in the coatings. The tuning action was fairly smooth and easy to adjust. However, when adjusted to near full height, there was a small air gap in the slot which might allow dust to enter the top end of the Paracorr even when an eyepiece is in place (unless a 2" eyepiece was being used, which usually blocks the slot with its barrel). For this reason, the Paracorr should be stored with the tuner in its lowest position and its dust caps in place.

Performance

I tested the Paracorr on a variety of Newtonians from my own 10 inch f/5.6 and a friend's 8 inch f/5 to a 17.5 inch f/4.5 Dobsonian. In general, the Paracorr did work as advertised, noticeably reducing the coma and producing better star images. This was particularly evident when used in the 17.5 inch (using a 31mm Nagler). Star images were pretty close to pin-points all across the field with the exception of some very minor lateral color present in very bright stars at the very field edge partly due to the eyepiece itself. Faint stars closer to the outer edge of the field also seemed just a bit easier to see. The f/5 and f/5.6 instruments also showed a visible coma reduction using the Paracorr, but the reduction was a bit less noticeable due to their longer focal lengths and slightly lower inherent coma.

One additional problem with short focal lengths in general is that many low to moderate cost eyepieces show significant astigmatism near the field edges which may completely mask the coma. Thus, to get the full benefit of the Paracorr, **quality eyepieces which are designed to effectively eliminate or minimize edge-of-field aberrations should be used.** For example, I could not clearly see much gain in edge-of-field performance in the 8 and 10 inch Newtonians with my 24mm Koenig due to its own aberrations, but with a 24mm Panoptic, the coma difference was easily detectable.

Still, in many telescopes, coma isn't exactly a huge aberration, and how much coma a person can tolerate will largely dictate whether that person would really benefit from owning a Paracorr. Some people don't mind a little coma at the edge of the field, and at focal ratios significantly larger than f/5, coma can become a relatively minor issue, especially in light of the cost of the Paracorr. The weight of the Paracorr+eyepiece can also be a significant factor in its usability, as additional counterweighting or friction measures may be needed to maintain telescope balance or to keep it from drifting downward if it's out of balance.

Summary

The Tele Vue Paracorr is an effective coma corrector for fast Newtonians, providing at least the potential for improving the star images over wider fields of view (if a decent eyepiece is used). It is not exactly inexpensive, but for larger short f/ratio telescopes, its benefits may outweigh its cost.

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