ARIES Chromacor

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Product Summary

The ARIES Chromacor is a revolutionary new product released in production quantities to the amateur astronomy community in 2001. It greatly improves the color correction of many achromatic refracting telescopes. It is specifically designed for 120mm f/8.3 and 150mm f/8 Chinese refractors sold under brand names such as Synta, Celestron, Skywatcher, Bresser, Hoon, and others. It also performs extremely well with the smaller 102mm f/9.8 achromats.

Because the Chromacor costs more than the 150mm refractor optical tube assembly, its cost-effectiveness for the smaller, extremely inexpensive scopes is generally lower than for the 150mm f/8 scopes.. Having said that, the performance level of the 120mm scope with Chromacor is spectacular. I own both sizes myself, and some other 120mm scope owners feel no need to move up to the 150mm scope despite their investment in a Chromacor suitable for either scope. The 120mm scope is obviously much more manageable on light mounts, and an over-mounted 120mm has some advantages over an under-mounted 150mm. The Chinese optical tube assemblies are so inexpensive that owning both is well within the means of most Chromacor customers.

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Key Features

- **Phantom glass has arrived, and it works!**

For many years, optical designers have known that by plugging unrealistic glass properties of unavailable "phantom glasses" into their computer programs, causing near-unthinkable optical results, some extraordinary optical designs were possible.

Among these are designs which "magically" correct an achromatic telescope to apochromatic performance. Chromacor is the first example, to my knowledge, of a true "phantom glass" (not just an incremental improvement or a move to a previously known, higher-priced material) actually being produced in quantity for use in a consumer product. Surely there have been other examples of "phantom glass" with one strange property or another having been made in a laboratory and added to a catalogue of known materials. Some of those have probably found their way into spy satellites or other exotic applications, and others are perhaps just curiosities.

But Chromacor is now available for you to own, complete with "phantom glass" which caused the naysayers to confidently claim that this device would never work. Others agreed that it was physically possible, but knew it would be difficult and expensive to accomplish, and might not make economic sense unless inexpensive and optically excellent achromatic refractors were available on a continuing basis.

- **Threads into your 2" diagonal via industry-standard 48mm threads.**

The Chromacor screws into your diagonal just like a standard 2" eyepiece filter.

What could be simpler?

You'll notice my own TV Everbrite diagonal with Vixen Lanthanum LV 6mm eyepiece above, with the eyepiece in the position I found gave the optimal color correction in a 150mm f/8 scope. The eyepiece is extended out of the 2-1.25" adapter slightly. If you're unlucky, you might even wind up with the eyepiece setscrew on its crazy recessed grooves. To avoid this, and allow the eyepiece be fully seated, add one or two 48mm spacer rings (from camera lens filters with the glass removed) between the Chromacor and diagonal. Astrobuffet provides 3 of these rings with the Chromacor, with additional ones available if your specific diagonal and eyepiece require different spacing. On a customer's 215mm f/12 refractor, we found that 7 spacer rings adding 38mm of spacing worked best, with his favorite Erfle eyepiece. On my 120mm Skywatcher, I need either one ring or none, to fully seat most eyepieces. It all depends upon the eyepiece and diagonal, but I've not yet personally run across a situation where optimum correction required a special diagonal. If it does, the TV 2-1.25 adapter is an obvious candidate for replacement, due to how far it sticks up.

- **Value-added benefits of buying your Chromacor from Astrobuffet**

ARIES admittedly does the "heavy lifting" by producing this breakthrough product in the Ukraine.

Astrobuffet provides additional value-added benefits beyond simply drop-shipping or receiving and forwarding the products to our customers.

Here is what you get from Astrobuffet, with each Chromacor purchased:

  - A high-quality new Japanese camera lens filter, for use as a dust seal during shipment and storage. Helps you avoid having to clean dust out of the open end of the barrel and risk touching the expensive glass.
  - Three (3) new, empty Japanese camera lens filter rings, to allow adjustment of the Chromacor-diagonal distance within your telescope tube. (I take 3 new filters and remove the filter glass from them myself.) Depending upon your choice of diagonal, 2-1.25" adapter, and eyepiece... and your preferred amount of remaining inward focuser travel and how far you are willing to dangle your various eyepieces out of the 2-1.25 adapter, these will give you some flexibility to adjust your setup to your liking..

- Importation hassles and charges all taken care of. Imported to the USA by international air courier fully insured, with customs clearance completed, and payment of import duty and customs brokerage fees already taken care of. Even in the large quantity of my first shipment, these costs were VERY significant. For a single unit, they could easily be $100 to $150, plus faxed powers of attorney and/or trips to a port of entry. I deal with the import hassles. You just receive a UPS air shipment from Massachusetts, of an item legitimately imported with all paperwork in order, and NO chance of owing USA import duty. I've paid it for you.
- No unexpected charges or unknown amounts due to credit-card currency conversion, international bank fees, unknown shipping charges, etc. There is not thequestion of whether duty will be due, as when you receive an expensive international shipment at the post office; There is no duty or unknown (often amazingly high) customs brokerage fees, due as when you receive an international air courier shipment.
- Two layers of sturdy, protective, and reusable individual packaging. Suitable for carrying and storing your Chromacor in, safe and sealed from dust, well-protected from physical damage. Serves as an inner box during shipment also, giving three layers of substantial protection to your investment.
- Additional packaging of the Chromacor and accessories for shipment, going well beyond physical protection. The Chromacor box is sealed in a freezer-thickness Ziploc bag, and place in a UPS box along with carefully thought out packing materials. Foam peanuts are enclosed in polyethylene bags to avoid peanut dust when unpacking. Peanut bags have pinhole vents added to prevent distorting the outer UPS box at altitude during air shipment.
- FREE UPS 2nd Day Air shipment from Astrobuffet to your door or workplace, anywhere in the 50 states, fully insured. A $12-$20 value...and yes, I've already had a customer in Alaska if you're wondering where it costs me $20 to ship to!

A Chromacor (retail price $750) plus the items and services listed in the 7 bullet points above, is available from Astrobuffet for $799 delivered to credit card customers in the USA. Only Massachusetts residents must add sales tax.

Astrobuffet also offers the same package for **$775 delivered** in the USA, as a special discount to those customers paying by money order, cashiers check, non-credit-card PayPal transfer, or check. Checks must clear before shipment.

- Additional filter rings are available for purchase: 3 for $12 postpaid in the 50 states via regular mail in a bubble envelope. In the future, I expect to also sell machined extension tubes of various lengths and materials.

Currently in stock at Astrobuffet are N, O1, and U2 Chromacors. U1 are back ordered and expected in January, 2002. As of my last order to ARIES, nobody had needed an O2, nor had they been available.

I guess I should have knocked on wood when writing that, as the second from left, of the four Celestron 150mm scopes shown mounted on my A-P 1200 QMD for testing/matching of OTA/Chromacor sets, turns out to need an O2. With an O1 it looks excellent on Jupiter, but the star test shows that it's still a little undercorrected, so an O2 should be even better.

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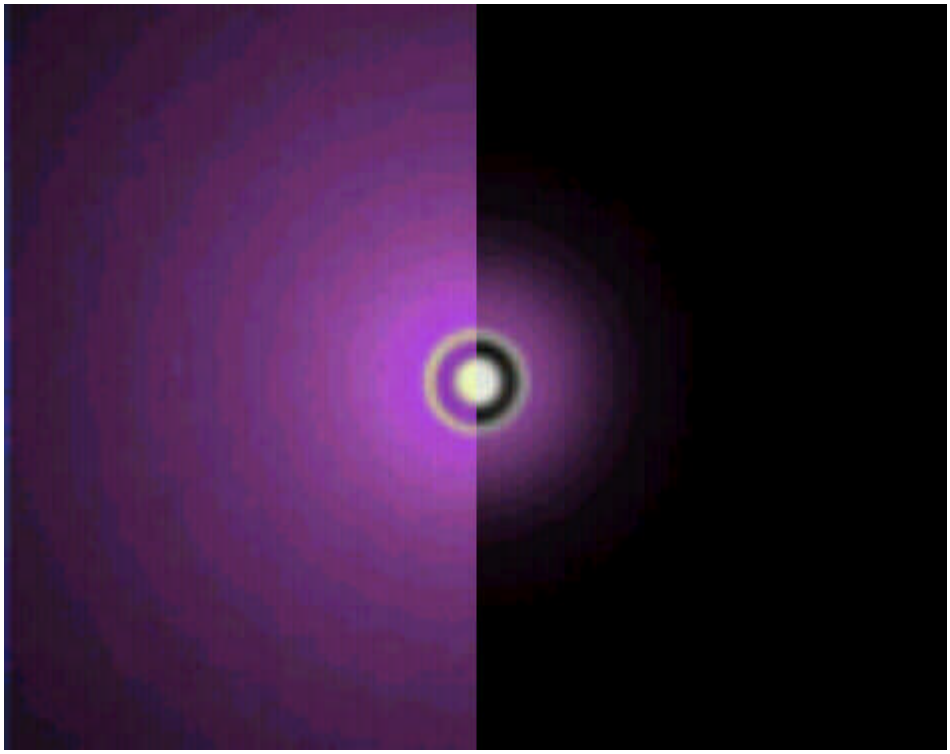
Great reduction of secondary spectrum



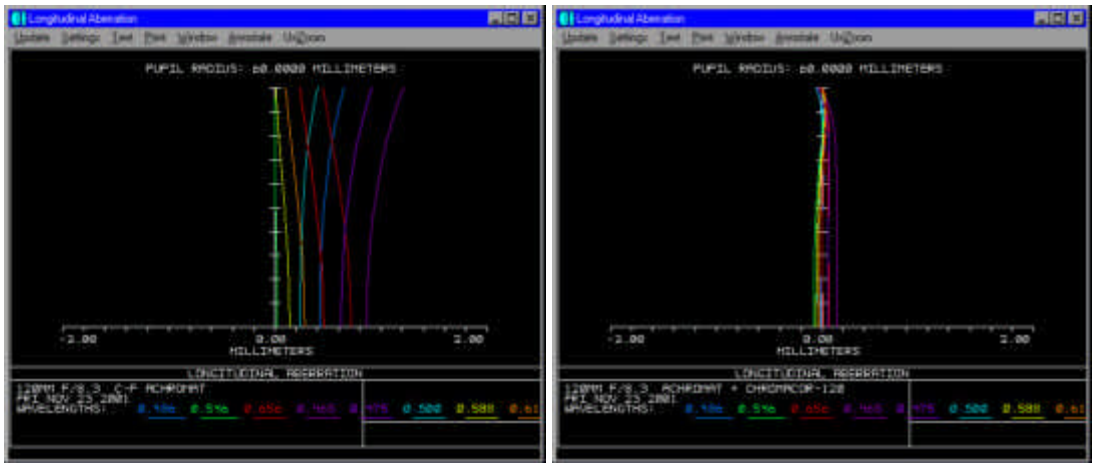
The greatest weakness of achromatic refracting telescopes is "color" or more technically, secondary spectrum. This means that the focal length of the telescope objective varies for different wavelengths of light.

Apochromatic (APO) refractors eliminate this problem but cost a great deal more money than achromatic refractors.

The main design concept of the Chromacor was to reduce secondary spectrum throughout the visible wavelengths of light, to a level directly comparable to or better than many popular, true APO scopes...and far better than all ED semi-APO scopes claiming APO performance.

The results are in: Chromacor has proven the naysayers wrong, and exceeded the expectations of the amateur astronomy community in accomplishing this primary goal.

120mm f/8.3 achromat without Chromacor....120mm f/8.3 achromat with Chromacor



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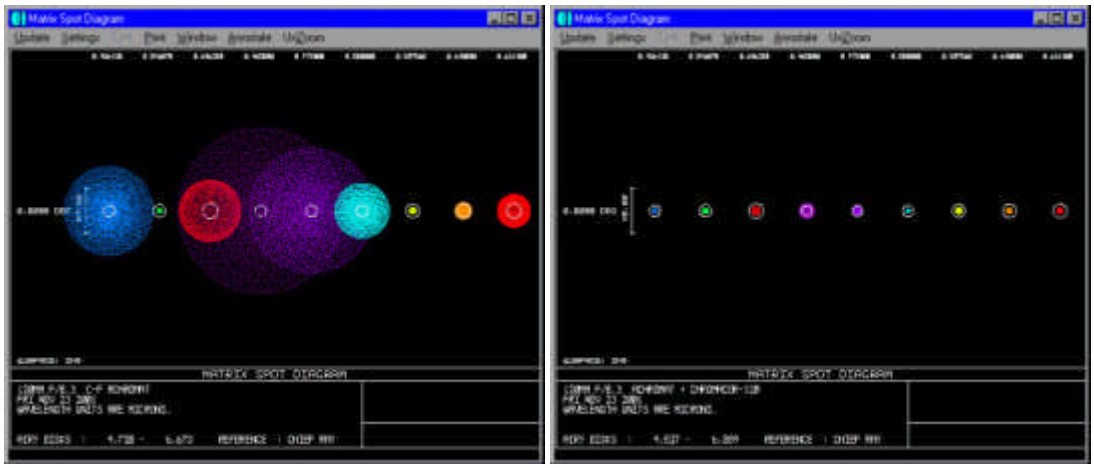

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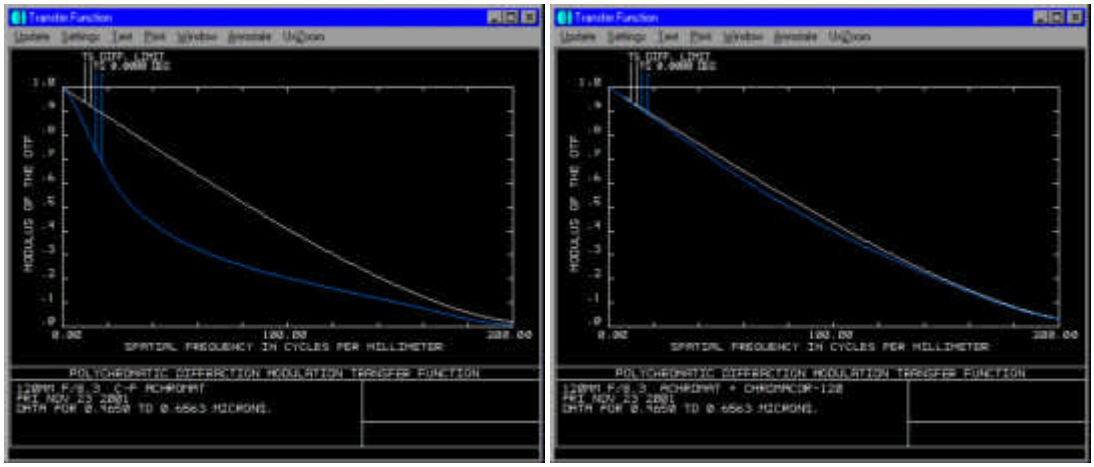

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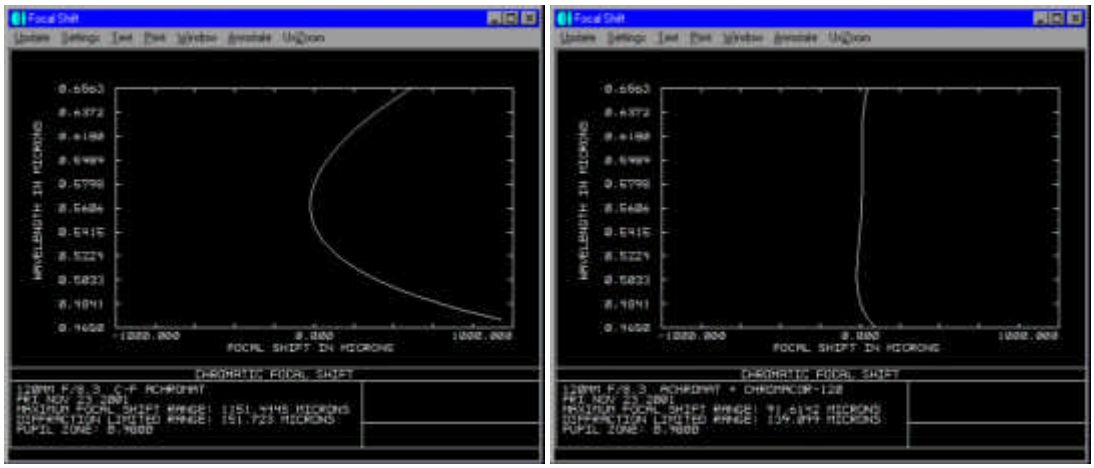

It should be noted that Chromacor is designed and recommended for visual use. For photographic and CCD work, true APOs still hold a number of significant advantages, including a flatter secondary spectrum into the ultraviolet, much wider usable field of view, compatibility with field flatteners, and so forth. Obviously there is nothing stopping a Chromacor owner from taking narrow-field photos which will be much better with a Chromacor than without, but this is an unsupported use of Chromacor, and should not be undertaken with expectations of being competitive with APOs optimized for photography.

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Customized spherical aberration correction

Chromacor is available in 5 different levels of customized spherical aberration correction. Correctly testing and matching the Chromacor to an individual telescope's spherical aberration can thereby remove objectionable levels of undercorrection or overcorrection. The Chromacor can be ordered in two versions which add approximately 1/7 or 2/7 wave of undercorrection to an overcorrected scope, two versions which add that same amount of overcorrection to an undercorrected scope, or a neutral version which leaves spherical correction unaffected in an already-superb scope.

Hence, achromat owners can typically test their own scope and order a matched Chromacor to get spherical aberration down to the levels delivered with the finest APO scopes, or better....often, much better!

Because not all achromat owners want to become spherical-aberration-testing experts, Astrobuffet also offers pre-matched telescope/Chromacor sets, eliminating the need for customer testing. For anyone who doesn't already own a 150mm f/8 Chinese achromat, the matched set can be purchased, and many hours of testing and worrying can be saved, for a modest premium above the cost of buying a telescope and Chromacor separately.

For Chinese achromats of 100mm to 150mm aperture and 1000mm to 1200mm focal length, with focal ratios of f/7 or numerically larger, the reporting of star test and/or Ronchi test results will be sufficient to allow Astrobuffet to easily choose the best match of a Chromacor for your scope, and confirm in-stock status.

Upon request, ARIES can analyze other aperture and focal length scopes to help choose the most appropriate match. For instance, a 215mm f/8.5 achromat was found to need a correction level which is approximately two levels different from that of a 150mm f/8, for the same star test results. Performance with off-design-point scopes like this are not guaranteed, but we will work together with the customer to attempt to obtain a good result.

In the end, what really made the commercial success of Chromacor possible, is this addition of spherical correction matching. Without this breakthrough, the slight variations in spherical correction of both the scopes and the Chromacors would have worked against each other, rather than working hand in hand. The need for perfectly null-corrected scopes is gone, and the need for perfectly null-corrected Chromacors is also gone.

Having said that, it must be noted that both the scopes and Chromacors fall within a very tight tolerance. Approximately 85% of the scopes to date have tested as correction level N or O1, only 1/7 wave apart. Thus the average Chinese scope is of the order 1/10 wave undercorrected, with a standard deviation of that same order. By necessity, Chromacors are made to match an equally tight range of values, rather than being randomly distributed among the 5 correction levels available.

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Elimination of spherochromatism

An APO refractor which has even zero spherical aberration in green light, will have measurable spherical aberration in blue and red light. This is called spherochromatism. Spherical aberration in matched Chinese-achromat/Chromacor systems are not only very close to zero, but are not subject to variation with wavelength. This is a true advantage over modern APO scopes.

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Chromacor Rental

A limited number of Chromacors (currently two, subject to change) are available from Astrobuffet for rental. Currently only the Chromacor-N is available for rental, but in the future this will be extended to the other types also. Rental is ONLY available to 50-state USA addresses, as I don't wish to deal with Customs paperwork more than once per unit, thank you!

One of the two rental units is currently on loan to an astronomical magazine. The other is "booked" until late January.

The upfront cost is the full purchase cost of a Chromacor package ($799 or $775 depending upon payment method); plus $150 to discourage each Chromacor buyer from going the rental/trial route as opposed to testing their scope properly and ordering the right one to begin with; plus the UPS 2nd Day Air charge from me to you. You are provided a fully prepaid UPS 2nd Day Air return box and shipping label. UPS will come pick it up from you when you are ready to return it.

Upon safe return of the rental Chromacor to me within one month of the date I shipped it out, you will be refunded $775 minus any condition change beyond normal wear and tear. A paint scuff/scratch or two is OK. Glass damage or sampling, disassembly/reassembly, cleaning, damaged threads, missing parts or packaging, or moderate/heavy cosmetic damage isn't OK. Before I would deduct anything for damage, I'd discuss it with you and offer you the option of taking the Chromacor back instead of a reduced refund.

Hence the 1-month total rental cost is $150, plus approximately $12 to $20 UPS 2nd Day Air shipping, plus any damage charges, plus the extra $24 if you chose the more expensive payment method.

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Author information goes here.