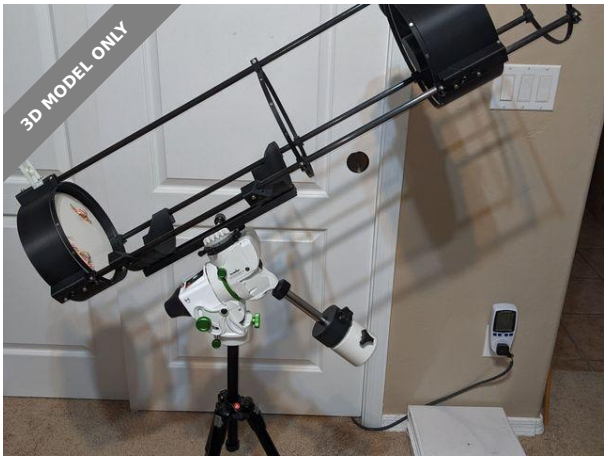

8" Newtonian Telescope "Leavitt" LITE (Metric)

Aurelian

VIEW IN BROWSER

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Summary

Based on Novel Tinker's 8" Leavitt keeping roughly the same design, but with the aim to be extremely lightweight (~8lbs)

Learning > Physics & Astronomy

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The Leavitt LITE takes the original Leavitt by Novel Tinker and does a few different notable things :

- Use metric M4 screws & 12mm rods, this falls inline with a transition from the Hadley to Leavitt if you're coming from the official Hadley Metric Remix
- Uses a 62.5mm secondary mirror (recommended for best uniform illumination on an F5 200mm mirror, can also cross reference with secondary mirror calculator
- Uses an overall smaller outer radius on parts (109mm) and thinner (but still sturdy) walls & rod interfaces to cut down on weight. It isn't much but it adds up!

- No conversion for Dobsonian mount, instead a mount interface for a Vixen Dovetail is provided with M5 screw holes
- Slight modifications to spider + sights to fit new layout
- Focuser clamp knob in case you don't want to buy thumb screws
- Primary cell changed to 120mm radius inner circle, 6 raised points of contact with small holes for better adhesion
    - Inner circle widening meant to both distribute the weight more and allow heatsinks to be attached to the back. My plan is to attach four 40mmx40mm heatsinks and have a quick-attach 120mm fan actively cool (WIP)

All that said, much of the credit and design goes to Novel Tinker for coming up with something that would fit on most print beds. Additionally, the basics of assembly instructions remains the same (using metric screws though) with some minor edits for QoL improvements:

- Use two (2) triangular turn knobs for the secondary cell main height screw and on the primary cell adjustment screws (one on either side of the LTA so once collimated you can easily turn them to lock) for a total of eight (8) knobs (see close up photos)
    - You can use a spring as well on the primary cell adjustment screws, but the mirror is soooo heavy I wouldn't count on it
- Use a nut on underside of primary cell and on top of spider for secondary cell adjustments to lock screw (see close up photos)
    - Do the spider/secondary cell nut to lock the screw after collimation!
- Can and probably should use a nut on the secondary cell main screw to lock in place
- Put glue all along the top flat outer ring of the primary cell and then once mirror is placed along the rim on the underside, using finger or popsicle stick to smooth out. Last thing you want is your very expensive primary mirror falling out (see dead-on photo of back of primary mirror - all the silvery stuff is the glue)

Files that remain the same and should be sourced from the original Leavitt :

- Focuser grub
- Focuser inner
- Focuser ring
- 1.25 inch eyepiece adapter

##EDITS##

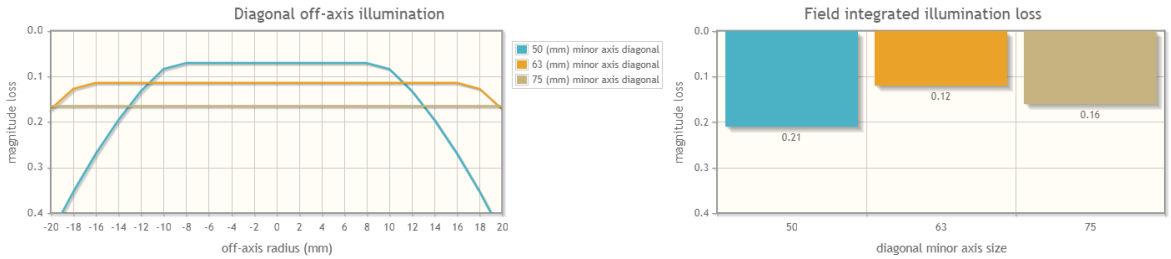
- Added the blender file in which this was made. Unless you're computer is fast you may face some “issues” with it running slow, such is the nature of many many modifiers.

- Added ribbed braced alternatives for the UTA, LTA could be done but is already fairly sturdy
- Added a thicker spider alternative. Does cut down on light capture but is far sturdier
- Added a little more tolerance to the secondary cell holder. Rising walls may be frail but that is okay, you should glue from the back anyways to avoid stressing the mirror during thermal acclimation

Overall using a mixture of the original Leavitt instructions and the above edits, the telescope is rock solid. In order to cut down on weight further I used 12mm 1000mm length carbon fiber rods. Pre-mirror installation the whole OTA including the ~300g long aluminum dovetail I have on it weighed 1660g (3.66lbs). With mirrors installed the OTA comes out to about 3855g (~8.5lbs)! This is light enough that I'm running it on a Star Adventurer GTI with accurate GoTo and tracking with a phone or camera attached (pictures of captures using these setups attached).

The whole purpose was to prove that you could do DSO astrophotography with maximal aperture (aperture is king alongside exposure - don't listen to those who say aperture isn't important) on a system that costs ~$1k USD. Likewise to prove that you can mount a large Newtonian on something less than an EQR-6. I will continue to post pictures taken with this setup, but a basic example of what can be done with standard stacking on a rather cheap mount is at the very end of pictures.

Secondary Mirror Graphs:



Notes:

Be careful tightening the secondary cell screws and screws pushing into the rods as you might flex the plastic and crack it (see last photos)

Be patient with the collimation process

If you want to do prime focusing you might want to pick up the alternate 1.25" eyepiece adapter to be able to push your focal point further down the focuser assembly (see Accessories down below)

Using nuts to compress-lock screws in place is a useful alternative to nylon locknuts and can work even better at times

For variable lengths on screws you can use the shorter length if you pad the hole with a little bit of cardboard. I did this since I don't like to have the screws press right up against the carbon fiber rods and scratch them up

My BOM for a very minimal setup using the QoL edits as seen in pictures i.e. two dovetail adapter pieces and not full ring, compression locking nuts, etc:

Screw Usage	**Length mm (M4)**	**Quantity**
Tube segment pushing on rods	8-10	14
Mount sights and push on rods	10-12	2
Mount sights, not on rods	8-10	2
Join tube segments (slant)	10	6
Spider to UTA, can push on rods	16	3
Secondary cell main height	50, 40 minimum*	1
Secondary cell adjusters	40, 32 minimum*	3
Primary cell adjusters	40, 32 minimum*	3
Focuser clamp	25	1
Focuser top panel mounting	10	2
Focuser top panel grub lock	16	2
Focuser front panel	10	2
Focuser mounting to UTA	10	4
Totals	**Screw Size**	**Quantity**
Assuming longer screws are used, use smaller screws as necessary if you buy an assortment set	M4x10mm	30
	M4x12mm	2
	M4x16mm	2
	M4x25mm	1
	M4x40mm	6
	M4x50mm	1
	M4 nuts	~55+

Don't forget your mirrors (F5 / 200-203mm 1000mm focal length & 62.5 mm secondary) and 12mm rods!

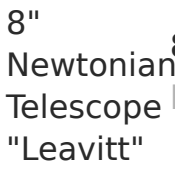
minimum* - You can get away with this shorter length but it will be difficult to have room to do adjustments

Accessories

Alternate 1.25" eyepiece adapter for being able to achieve prime focus and eyepiece focus as well

Secondary mirror minimal dust cover (still working on primary mirror dust cover, but not high priority as I'm using the cheap plastic cover that came with the mirror)

This remix is based on



8" Newtonian Telescope "Leavitt"
by Novel Tinker

Model files

AlternateSpider 1 file

metric_conversion-leavitt_spider_thick.stl

SecondaryCell_0.25mm_Tolerance 1 file

metric_conversion-leavitt_secondary_cell_625mm_025m... .stl

UTA_RibBraced 2 files

metric_conversion-leavitt_uta_braced_segment_x2.stl

metric_conversion-leavitt_uta_braced_focuser_segment .stl

blender 1 file

metric_conversion.blend

"CAD" file

metric_conversion-leavitt_knob_x8.stl

metric_conversion-leavitt_eyepiece_clamp.stl

metric_conversion-leavitt_upper_sight.stl

metric_conversion-leavitt_focuser_grub_screw_panel.stl

metric_conversion-leavitt_lower_sight.stl

metric_conversion-leavitt_secondary_cell_625mm.stl

metric_conversion-leavitt_focuser_outer_top.stl

metric_conversion-leavitt_focuser_outer_bottom.stl

metric_conversion-leavitt_uta_segment_focuser.stl

metric_conversion-leavitt_dovetail_tubeattachsegmen... .stl

metric_conversion-leavitt_lta_segment_x3.stl

metric_conversion-leavitt_uta_segment_x2.stl

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metric_conversion-leavitt_primary_cell.stl

m4_knob.stl

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