

ASTC02 - PROF. HANNO REIN

WELCOME!

WHAT YOU'LL LEARN IN THIS COURSE

1. ASTROPHYSICS

2. OPERATING THE TELESCOPES

3. DATA ANALYSIS

ASTROPHYSICS

1. Coordinate systems
2. Orbital motion of planets, asteroids and comets
3. Evolution of stars
4. Star clusters and galaxies
5. Distance measurements

TELESCOPE

1. Basic operation of a telescope
2. Finding objects in the sky
3. Specifics about the UTSC telescopes
4. CCD Cameras
5. Electronics

DATA ANALYSIS

1. python + jupyter-notebooks
2. Data analysis
3. Image processing
4. Fitting and Markov Chain Monte Carlo

GRADES

| | |
|-------------|-----------|
| Midterm | 20 points |
| Final exam | 30 points |
| Lab reports | 50 points |

PRACTICALS

- Sun spots
- Zoo of astronomical objects
- Stellar magnitudes
- Asteroid orbits
- Density profile of star clusters

LAB REPORTS

- You work with your own dataset
- Need to write your own data reduction pipeline in python
- Need to write up results. **Polish** the report.
- Can work together, but everyone needs to submit their own report. You do need to say which parts you've collaborated on.

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SOFTWARE

SOFTWARE

Download the Unistellar App for your phone/
tablet.



Available on the iPhone

App Store



ANDROID APP ON

Google play

SOFTWARE

- Python 3.x
- Jupyter-notebooks
- numpy, scipy, matplotlib
- rawkit
- mpldatacurser
- pillow
- rebound

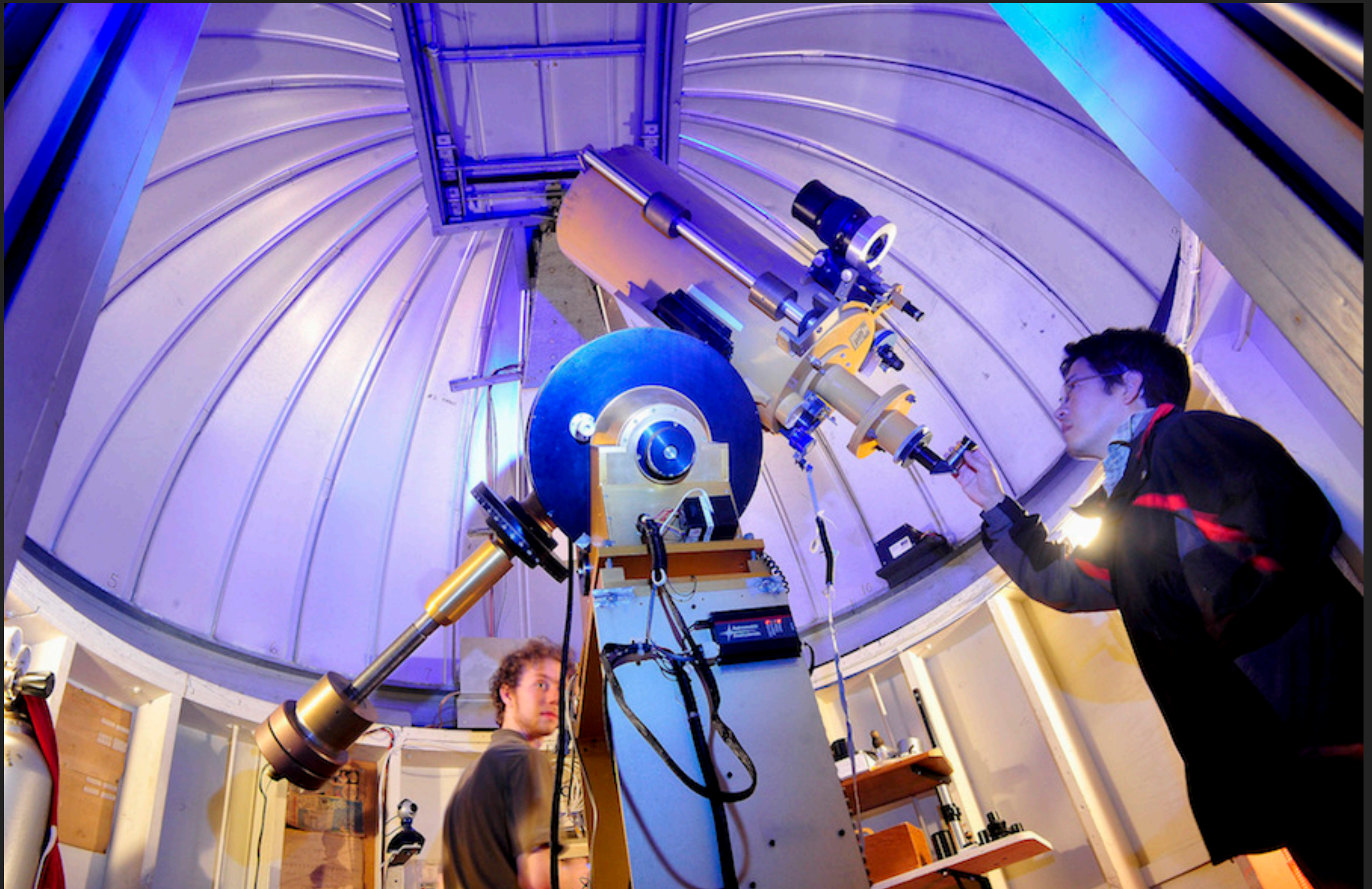
STELLARIUM



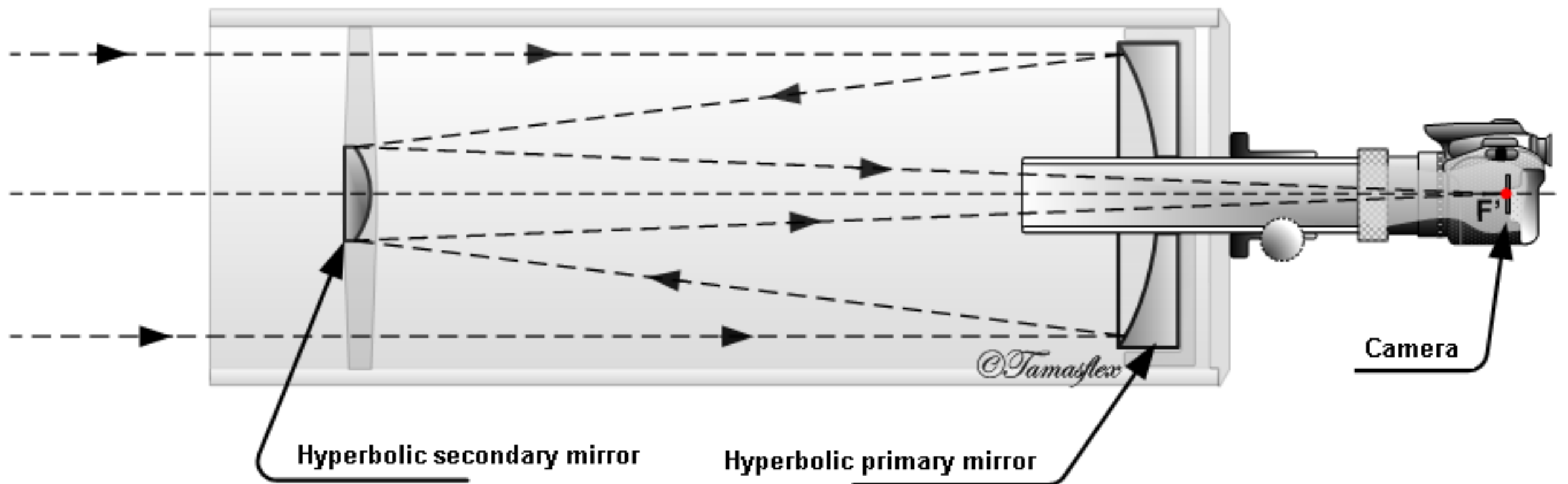
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TELESCOPES

UTSC TELESCOPE ON SW ROOF



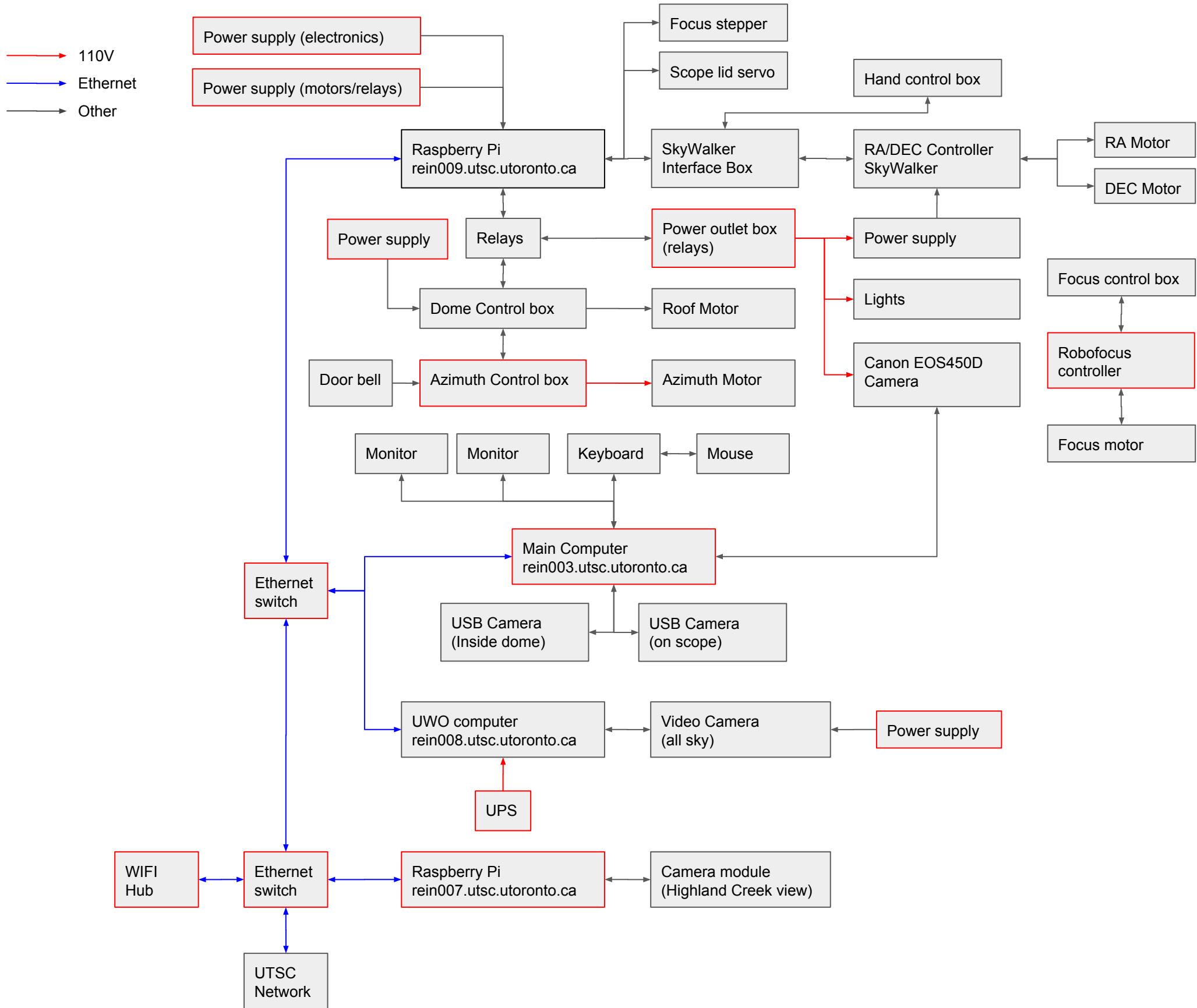
8-INCH F/8 RITCHEY-CHRETIEN



Ritchey - Chrétien (RCT)

Also: Hubble Space Telescope, Keck telescopes, ESO Very Large Telescope

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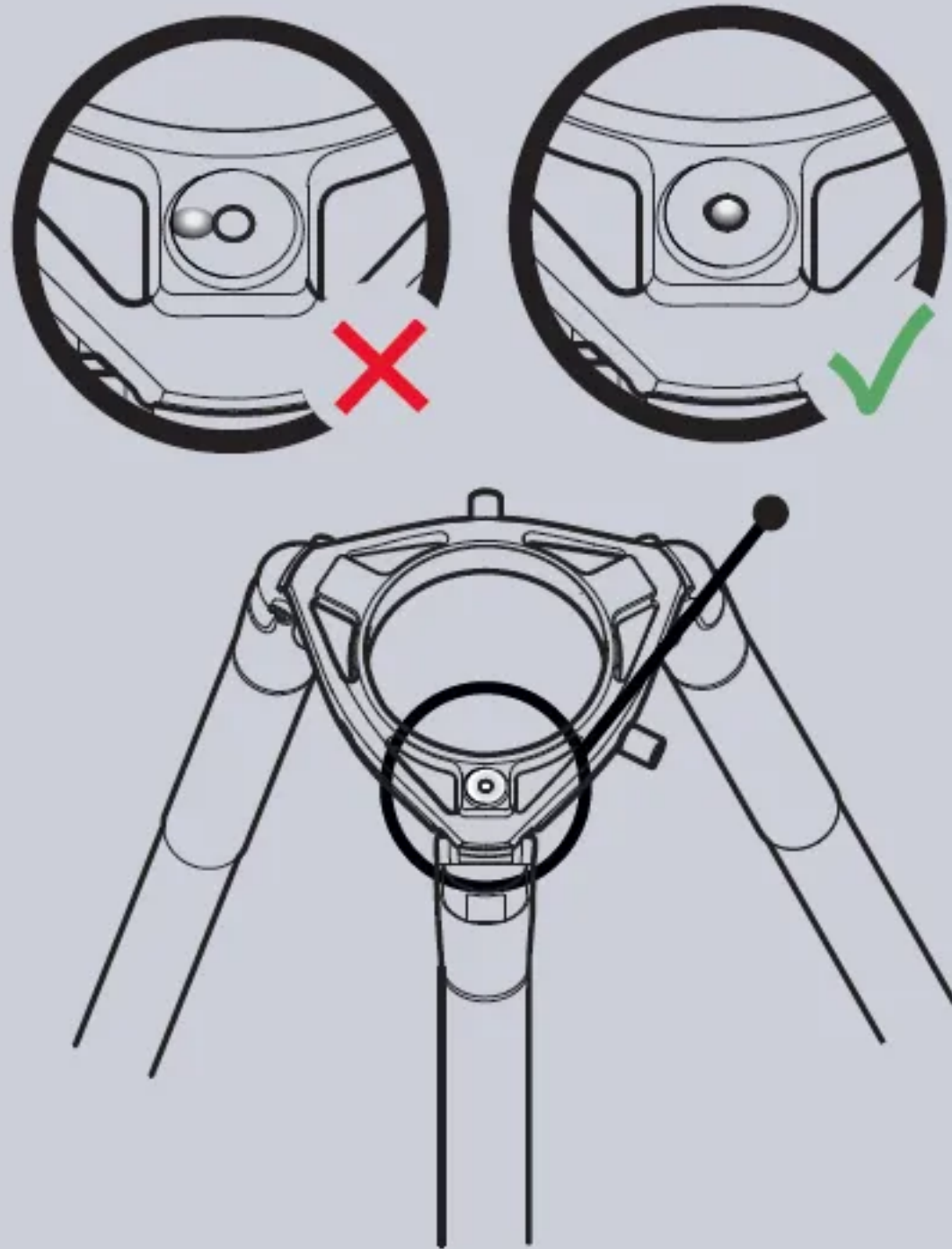
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UNISTELLAR EQUINOX

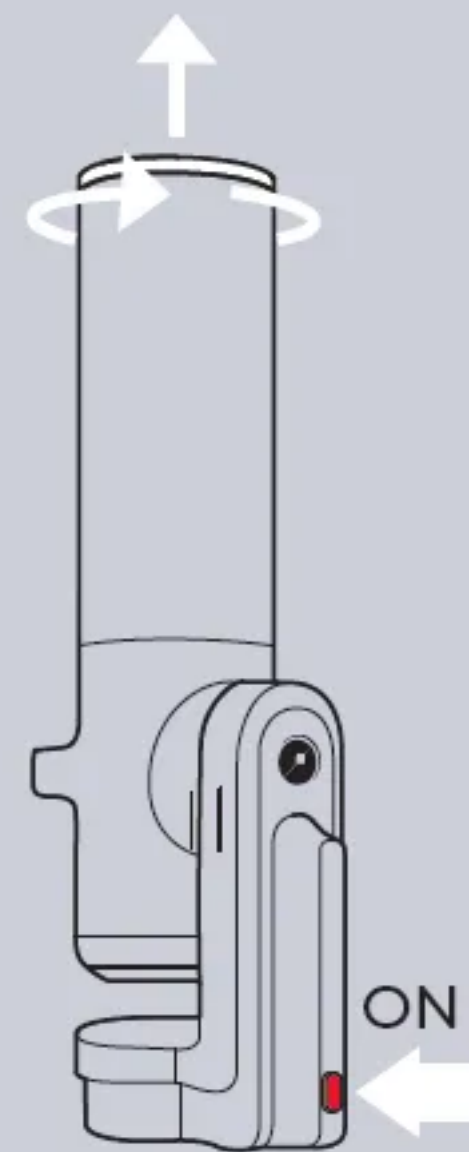
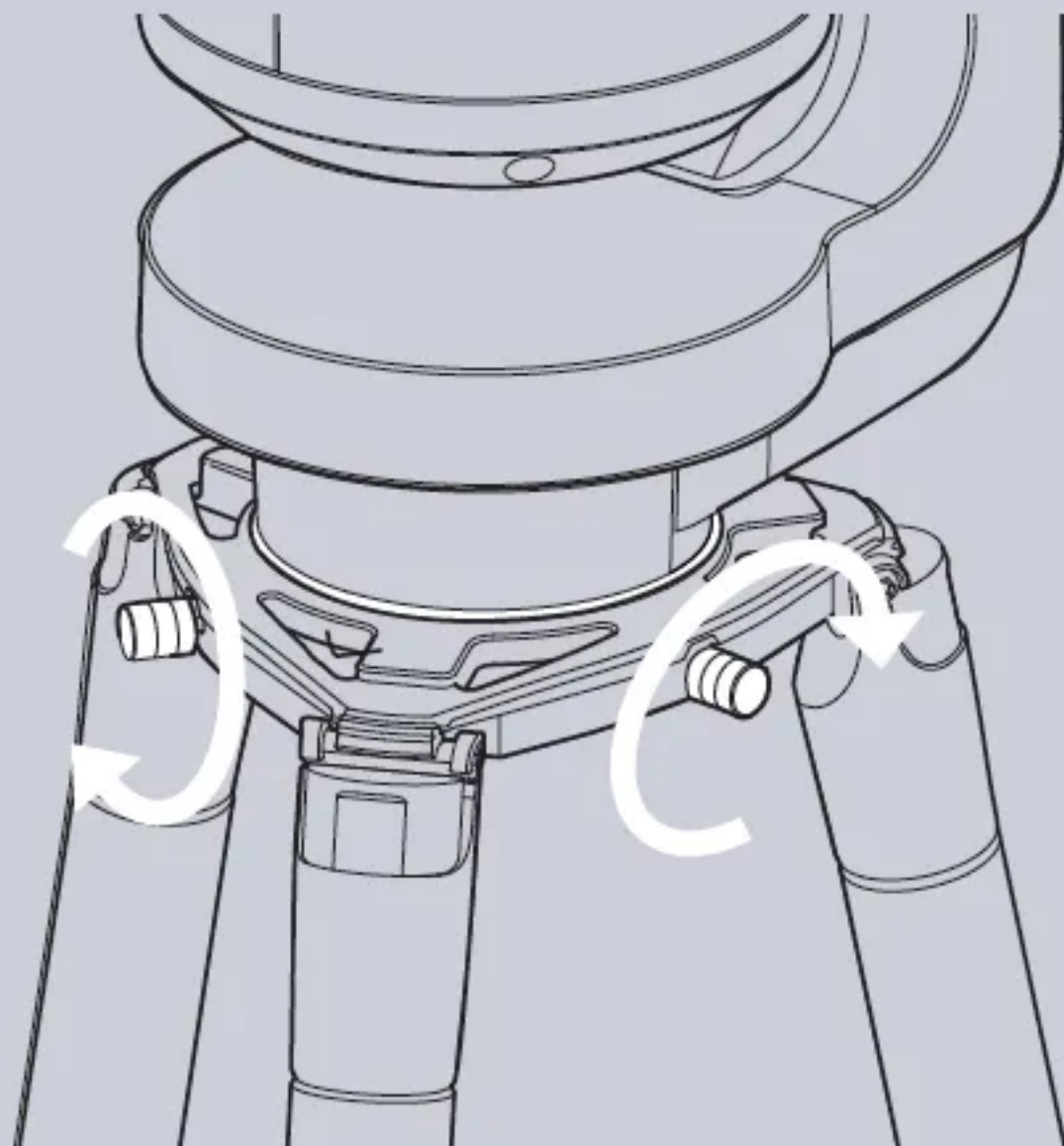
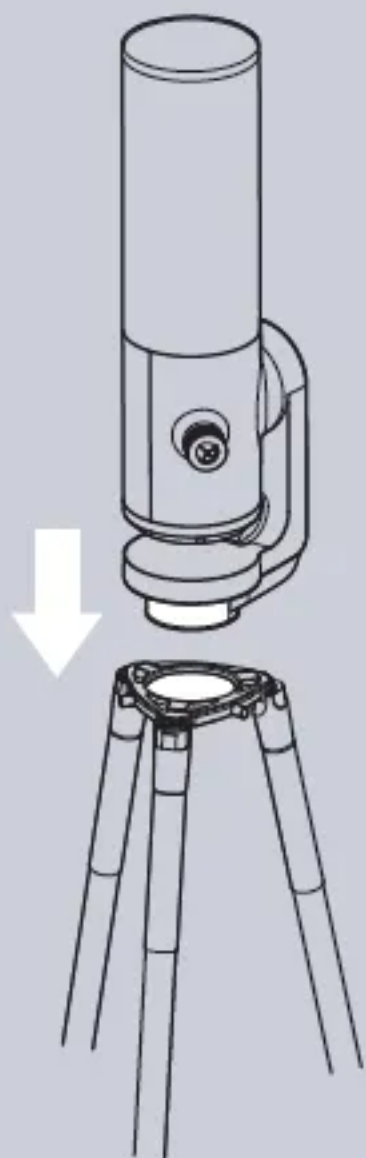




LEVEL TRIPOD



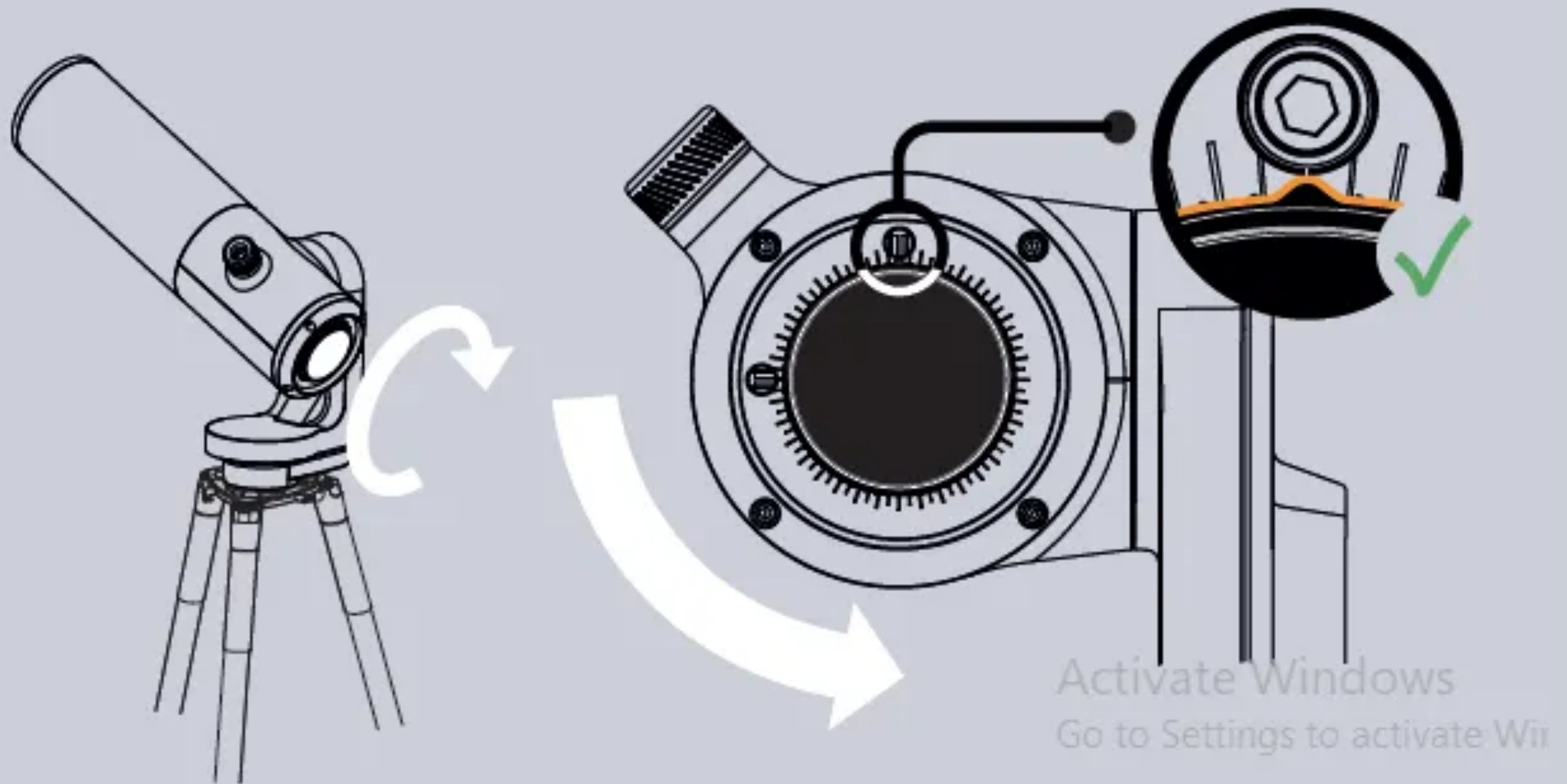
TIGHTEN SCREWS



CONNECT TO THE TELESCOPE

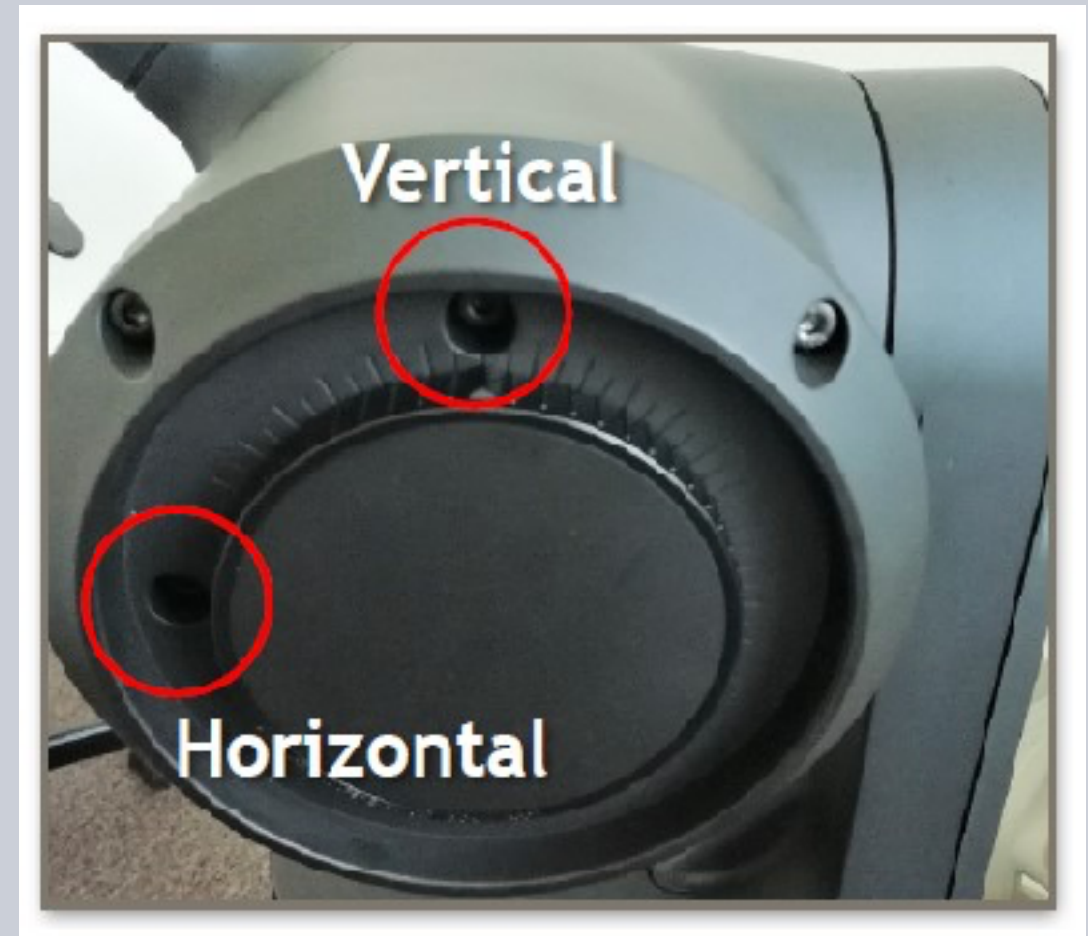


FOCUS



NEXT STEPS:

- Align and track
- Dark frames
- Collimation



UPDATE

- The app might ask you to perform a software update on the telescope.
- Do it.
- Be patient. It just takes a few seconds.
- Don't leave the app on your phone.

OBSERVING

- Save images to your phone/tablet
- Choose format without frame/logo
- Transfer to a computer for data analysis
- Preferred: download raw data from telescope directly to your computer/phone (TIFF/FITS)

COMING WEEKS

1. Lecture from 6-8pm
2. Practical (observing) from 8pm-10pm if weather permits

You need to be able to come to the tutorial and stay until the end.

Make arrangements for:

- Late night / dark commutes
- Cold temperatures

FIRST OBSERVING LAB

> handout