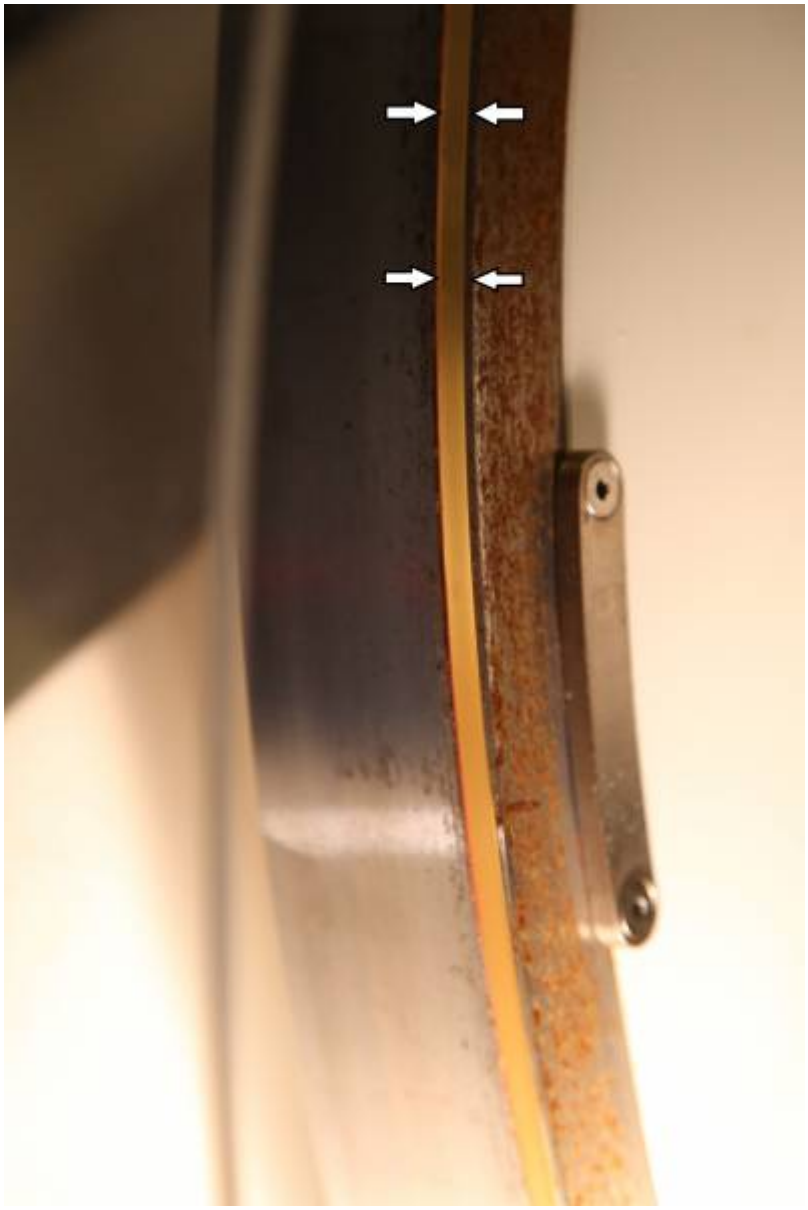
How the Optical Tape and Read Heads Work

The optical tapes on the axes of the Schulman Telescope are the most precious and delicate parts of the system. They should be protected at all times and maintained with great care. The optical tape and read heads are exposed on the RA axis for this system. A Plexiglas shield offers some protection for the tape from accidental collisions and debris. There does exist a cover designed for the RA axis; but it was determined that a darkened enclosure increases the instances of attracting moths to reside in this area and ultimately dirty the tape (Usually by their untimely demise by being pressed and extruded through the roller bearings). Leaving the tape exposed to light has minimized downtime due to moths by nearly 90%. This comes at a price. Condensation and other environmental effects do occasionally render parts of tape unreadable by the read heads.



The read heads for the RA axis are atop stalks that terminate very close to the surface of the optical tape. The tape needs to be both clean and aligned with the read head window in order for the reflected (IR) signal from the read head to be registered with good fidelity. There are two read heads which used to operate simultaneously in order to reduce eccentricity of the RA axis. However it was quickly determined that two operational read heads also double the failure events since either one can have an issue. In 2014 the system was converted to a single read head configuration. Currently the West read head is active. Should there be an issue with the West read head (or side of the tape) switching to the East read head is possible. Access the panel on the East side to swap the cables.

Behavior of Faults Due to the Optical Tape