Stellar Aberration Correction

- Apparent shift in the position of celestial sources due to the velocity of the observer
- Magnitude of the offset is ~sin(_)(v/c), where _ is the angle to the velocity vector.
- An object at the ecliptic pole will appear to trace a circle with 20.5" radius due to the motion of the Earth around the Sun. An object at the orbit pole will appear to trace a circle with radius ~5" due to the orbital motion of the spacecraft around the Earth.
- Three places to apply this correction:
  – attitude used to determine GLAST tracking.
  – attitude provided by the spacecraft.
  – apparent positions of individual gamma-ray photons.

Stellar Aberration

- **Observatories which have high resolution instruments with a small field of view (e.g. Swift, Chandra) often choose not to apply the correction if the star tracker is co-aligned with the instrument FoV and defines the observatory coordinate system. Why is this useful?:**
  - **The target will remain stationary in the field of view.**
  - **The aberration will be essentially constant across a small field of view and can therefore be neglected. Unaberrated coordinates for guide stars define the observatory coordinate system, resulting in unaberrated science photon positions.**
- **This is not applicable to GLAST**
  - **The star trackers are no co-aligned with the LAT FoV.**
  - **Even if they were, the correction would vary significantly across the large field of view, there is no way to track that would obviate the need to apply an aberration correction to the gamma-ray photons.**
  - **So we should apply the aberration correction to all 3 areas, tracking solution, reported spacecraft attitude and gamma-ray photons.**