

## Astrometric and photometric standard candidates for the 4-m ILMT survey

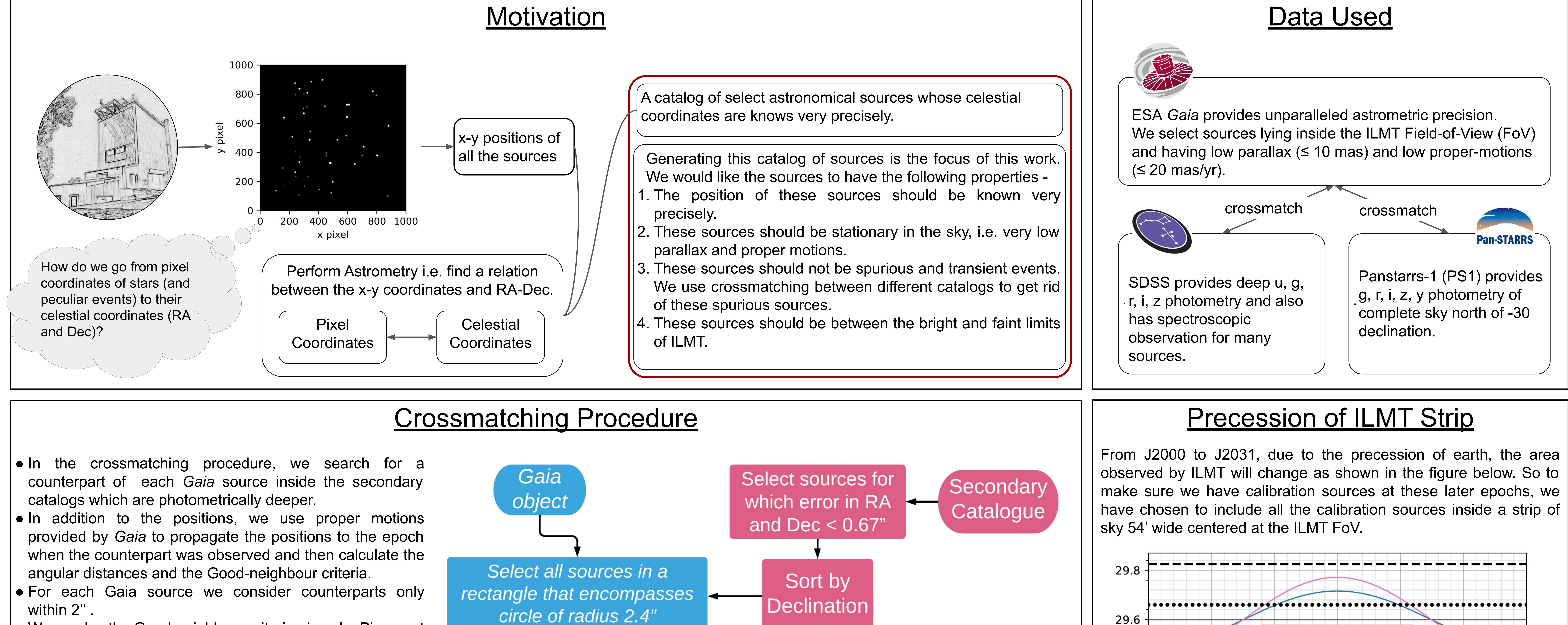
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## Abstract

The International Liquid Mirror Telescope (ILMT) is a 4-m class survey telescope that has recently achieved first light and is expected to swing into full operation very soon. It scans the sky in a fixed 22' wide strip centered at the declination of 29°21'41" and works in Time Delay Integration (TDI) mode. We present a full catalog of sources in the ILMT strip that can serve as astrometric calibrators. The characteristics | of the sources for astrometric calibration are extracted from Gaia EDR3 as it provides an exact measurement of astrometric properties such as RA ( $\alpha$ ), Dec ( $\delta$ ), parallax ( $\pi$ ), and proper motions ( $\mu_{\alpha*} \& \mu_{\delta}$ ). We |have crossmatched the Gaia EDR3 with SDSS DR17 and PanSTARRS-1 (PS1) and supplemented the catalog of these sources in g, r, and i filters. We also present a catalog of spectroscopically confirmed white dwarfs with Sloan Digital Sky Survey (SDSS) magnitudes that may serve as photometric calibrators. The catalogs generated are stored in an SQLite database for query-based access.



• We employ the Good-neighbour criteria given by Pineau et al. (2011) which quantifies the likeliness of a crossmatch being genuine based on the angular separation and errors in the positions.

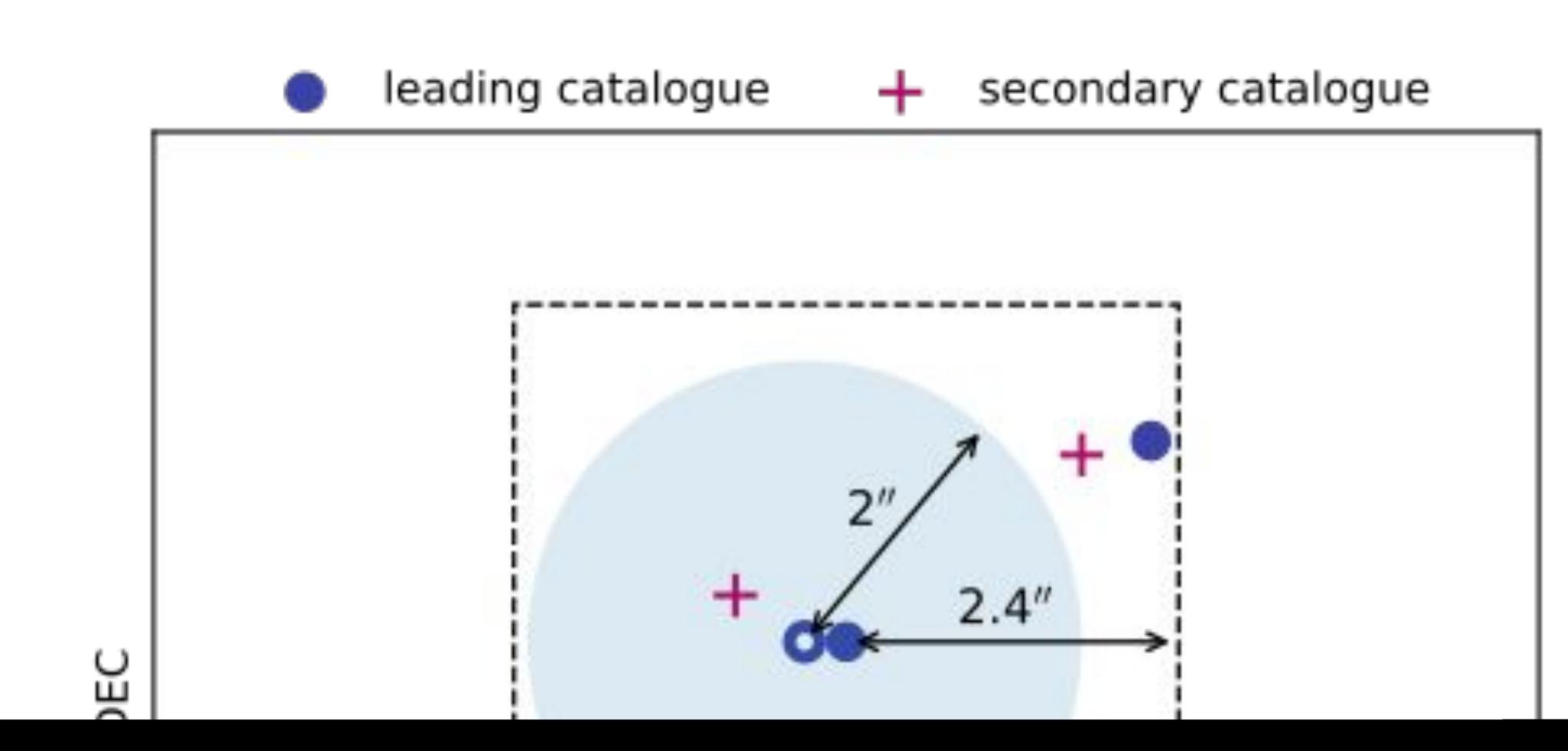
Calculate the angular distances

between new positions of Gaia

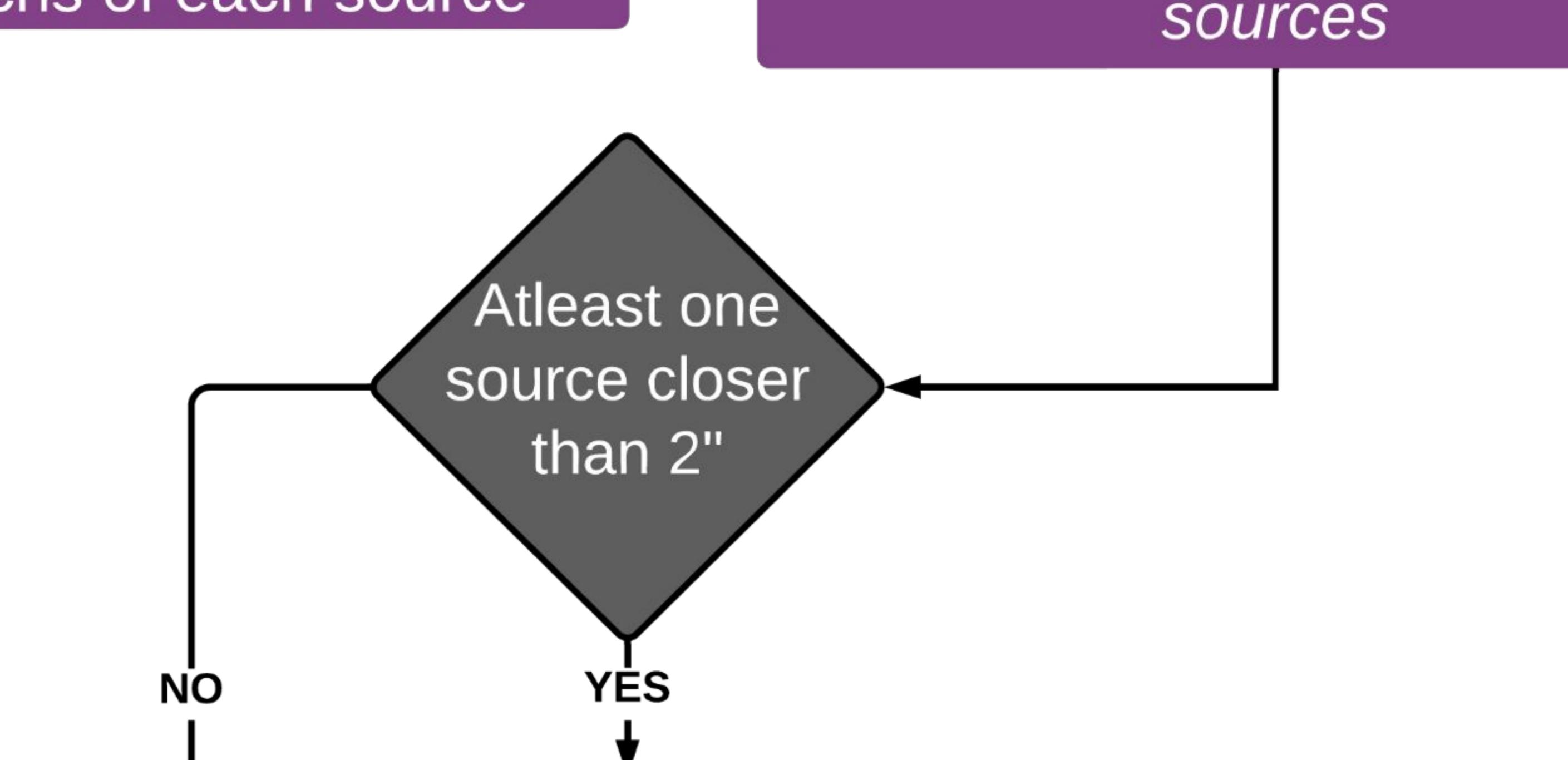
source and secondary catalogue

— ILMT FoV in from equinox J2000

- The diagram below shows a possible scenario that may arise. The dashed rectangular region shows the first cut in Covariance matrix of Gaia source<sup>1</sup>  $\rightarrow$ the RA-Dec space. The 2" circle is calculated after correcting for proper motions.
- This procedure is performed on ~5.4 million sources to find a counterpart for each of them.



Propagate position and to the epochs of each source



 ILMT FoV in from equinox J2021 ILMT FoV in from equinox J2031 — – Our catalogue strip a' 29./ Mandal et al. strip <u>g</u> 29.2 29.0 -360 240 RA (degree)

## Crossmatching Results

We have found crossmatches 3.93 million Gaia sources in SDSS and PS1. 3.56 million of these sources have i magnitude between 16.5 and 22 mag. Plots containing RA distribution of these sources, distribution of angular distances to the counterpart, and distribution