We combine Chandra X-ray data with HST optical imaging to directly identify low mass and high mass X-ray binaries (XRBs) within M83 and construct uncontaminated X-ray luminosity functions (XLFs) for nearby, late-type galaxies.

Method

1. Align Chandra X-ray source positions with HST optical images.
2. Measure UBVI photometry of potential donors within 2σ positional uncertainty of X-ray sources.
3. Remove non-XRB contaminants (AGN, quasars, SNRs).
4. Compare magnitudes and colors of stars to theoretical stellar evolutionary tracks to estimate mass. For clusters, estimate the age to get XRB mass.
5. Generate XLFs.

Preliminary Results

- Obtained an uncontaminated XLF for high-mass XRBs in M83.
- Constructed the first XLF for low-mass XRBs in a late-type galaxy.

Future Work

Include larger sample of nearby galaxies to establish ‘universal’ XLFs for late-type galaxies.

References:
[1] Chandar et al. in prep