

## Image a Spiral Galaxy Seen with Chandra

### *Basic Steps:*

1. Find Chandra Observation of the galaxy M101 in archive. Better more than one. Make sure that one of the observations will allow you to obtain a background region.  
Obsids:
2. How much of the observation is effected by background flares?  
And how can that be determined?
3. In what energy band can one best see the diffuse emission?
4. What dominates the spectrum of the diffuse emission?

### *Advanced Topics:*

1. How faint a source can be detected at a significant level in your image?
2. The change in the size and shape of the PSF with distance from the optical axis can be readily seen in the image of M101. What effect does this have on the source detection limit?
3. For how small a region can one extract a useful spectrum?  
How can one study the spectrum of smaller regions without obtaining more data?
4. How could one obtain a spectrum of the background flares?

Suggested reading: “Diffuse X-ray Emission from M101” by Kuntz et al. 2003, ApJ, 588, 264 *and* “Chandra X-ray Sources in M101” by Pence et al. 2001, ApJ, 561, 189