Chandra Observations of Abell 222 & Abell 223

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Abstract

We present the results of a Chandra observation of the relaxed cluster Abell 222. The cluster was observed with the ACIS-I detector for a total of 100 ksec (100 ksec/total). After removing the diffuse background from the surface brightness from 1 arcmin to a distance of 2 arcmin, we find that the surface brightness is consistent with a scale length of 1 arcmin. For A 222, we find that the ellipticity is consistent with a scale length of 1 arcmin. We find that the intensity drops rapidly in the first 0.5 arcmin. The ellipticity of A 222 has a different position angle. To characterize this difference, we use the ellipse fit to the outer region of each cluster. Figure 1 shows the intensity, ellipticity, and position angle of each cluster. Relatively soft and hard images were constructed from 0.75 to 1.3 keV. In addition to the changes in the centroid, position angle (P.A.) and the ellipticity, we generate a hardness ratio map of the cluster. Fixing the abundance to 0.37 solar and N\(_{soft}\) = 144000 (Gueron et al. 2001) and 0.38 solar and N\(_{soft}\) = 144000 (Soucail 2002). The extracted spectra were fitted between 0.3 to 1.3 keV with a metal abundance of 0.36 solar with a temperature of 0.73 keV and a metal abundance of 0.38 solar with a temperature of 0.71 keV. Fixing the abundance to 0.37 solar and N\(_{soft}\) = 144000 (Gueron et al. 2001) and 0.38 solar and N\(_{soft}\) = 144000 (Soucail 2002). The extracted spectra were fitted between 0.3 to 1.3 keV with a metal abundance of 0.36 solar with a temperature of 0.73 keV and a metal abundance of 0.38 solar with a temperature of 0.71 keV.

Conclusions

The X-ray image of A 222 shows that these two clusters are not of the same age and morphology. The temperature of the outer regions is consistent with a scale length of 1 arcmin. In addition, the ellipticity changes with time, indicating that both clusters have not relaxed. In the outer regions, we find that the intensity drops rapidly in the first 0.5 arcmin. The ellipticity of A 222 has a different position angle. To characterize this difference, we use the ellipse fit to the outer region of each cluster. Figure 1 shows the intensity, ellipticity, and position angle of each cluster. Relatively soft and hard images were constructed from 0.75 to 1.3 keV. In addition to the changes in the centroid, position angle (P.A.) and the ellipticity, we generate a hardness ratio map of the cluster. Fixing the abundance to 0.37 solar and N\(_{soft}\) = 144000 (Gueron et al. 2001) and 0.38 solar and N\(_{soft}\) = 144000 (Soucail 2002). The extracted spectra were fitted between 0.3 to 1.3 keV with a metal abundance of 0.36 solar with a temperature of 0.73 keV and a metal abundance of 0.38 solar with a temperature of 0.71 keV.