I present the first results of a search for clusters of galaxies in Chandra ACIS pointed observations at high galactic latitude with exposure times larger than 10 ks. The survey is being carried out using the Voronoi Tessellation and Percolation technique, which is particularly suited for the detection and accurate quantification of extended and/or low surface brightness emission in X-ray imaging observations. A new catalogue of 36 cluster candidates has been created from 5.55 deg$^2$ of surveyed area. Five of these candidates have already been associated to visible enhancements of the projected galaxy distribution in low deepness DSS-II fields and are probably low-to moderate redshift systems. Three of the candidates have been identified in previous ROSAT-based surveys. I show that a significative fraction (30-40%) of the candidate clusters are probably intermediate to high redshift systems. In this paper I publish the catalogue of these first candidate clusters. I also derive the number counts of clusters and compare it with the results of deep ROSAT-based cluster surveys.

Cosmology: large-scale structure of Universe – Galaxies: clusters: general – X-rays: galaxies: clusters

Introduction

Clusters of galaxies are very important objects in astrophysics. Observations of such systems at different redshifts can be used, for instance, to explore galaxy evolution in very dense environments (e.g. Dressler et al. 1997; Jorgensen et al. 1997; Kelson et al. 1997; Ellingson et al. 2001; Nelson et al. 2001; van Dokkum & Franx 2001). Clusters are also crucial probes of mass distribution at intermediate and large scales (e.g. Nichol et al. 1992; Collins et al. 2000; Schuecker et al. 2001; Gonzalez et al 2002). Moreover, in the scenario of hierarchical structure formation, the estimate of cluster abundance as a function of their mass and redshift plays a fundamental role in constraining the cosmological parameters $\Omega_m$ and $\sigma_8$ (e.g. Bahcall & Cen 1993; Girardi et al. 1998; Borgani et al. 2001; Reiprich & Böhringer 2002). Following a different approach, observations of the Sunyaev-Zeldovich effect (Sunyaev & Zeldovich 1972) in a large sample of distant clusters can also be used for a direct measurement of their distances, and can thus provide estimates of the Hubble’s constant (Mauskopf et al. 2000; Reese et al. 2000).

Observations and data analysis

The data used in this paper are 81 Chandra ACIS pointed observations downloaded from the public archive. Selected observations have exposure times larger than 10 ks (see Fig. fig:H3892F01.ps) and absolute galactic latitude larger than 20 deg. Histogram of the exposure times for the 81 selected Chandra ACIS pointings. Fig: H3892F01.ps