Initial Optical Results for the ChaMPlane Survey

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1. Introduction

We present initial, and representative, optical results from the Chandra Multiwavelength Plane (ChaMPlane) Survey (see paper by Grindlay et al. in this Volume). ChaMPlane is a project to identify a large sample of serendipitous X-ray sources in deep galactic plane fields imaged by the Chandra X-ray Observatory in order to determine the populations of accretion-powered binaries in the Galaxy. The primary goal of ChaMPlane is to identify Cataclysmic Variables (CVs) and quiescent Low Mass X-ray Binaries (qLMXBs), in order to constrain and ultimately measure their number and space density luminosity functions. The secondary objectives are to determine the Be High-Mass X-ray Binary (BeHMXB) content and stellar coronal source density in the Galactic Plane.

2. Observations and Results

The ChaMPlane Optical Survey is one of NOAO’s Long Term Survey Programs. In the past two years we have successfully conducted the ChaMPlane survey and obtained deep images in the V, R, I and Hα bands for 24 Chandra fields from CTIO (17 fields) and KPNO (7 fields) 4-m telescopes with the Mosaic (36' × 36') camera, with a total coverage of more than eight square degrees in the galactic plane. This is the deepest Hα survey on portions of the galactic plane; and it covers ~5× the area of the enclosed ChaMPlane X-ray Survey. The ChaMPlane NOAO imaging survey serves two purposes: 1) to provide images for identifying the optical counterparts of Chandra sources and to measure their V, R, I, Hα magnitudes to enable approximate spectral classification and constraints on reddening; 2) to identify Hα emission objects (by comparing their magnitudes in Hα vs. R filters) as well as to measure their V, R, and I magnitudes. The NOAO Survey will eventually yield ~100 fields (Mosaic) near the galactic plane, or about 36 square degrees.

So far the ChaMPlane survey has detected several thousand serendipitous X-ray sources. A significant fraction (more than 50% for moderately reddened fields) of their optical counterparts are found in the Mosaic images. CVs and qLMXBs are identified by their ubiquitous Hα excess as “blue” objects in the (Hα− R) vs. R color-magnitude diagram. Source #39079 is the first CV candidate found (see Fig.2).
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