Hubble Space Telescope

Cycle 16 AR Proposal

Ultraluminous X-ray sources in elliptical galaxies and the X-ray binary/globular cluster connection

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Scientific Category: UNRESOLVED STELLAR POPULATIONS

Scientific Keywords: X-RAY BINARIES, SURVEY, GLOBULAR CLUSTERS, STELLAR POPULATIONS IN EXTERNAL GALAXIES

Total Budget Amount: $66,700

Abstract

We propose to exploit archival HST/ACS observations of 100 spheroidal galaxies in the Virgo cluster in order to identify the optical counterparts of about 4500 bright X-ray binaries from our ongoing Chandra survey. Based on the shape of the cumulative luminosity function scaled to the mass of the whole sample, we expect to detect around 100 Ultraluminous X-ray Sources (ULXs): the combination of the high resolution and sensitivity of the ACS images will effectively allow us, for the first time, to discriminate between background sources and genuine ULXs for each and every candidate. This, in turn, will allow us to determine whether early-type galaxies harbor ULXs in abundance, and, if so, whether they are preferably in globular clusters, also readily identifiable from the HST images. In addition, this unprecedented catalog of optical counterparts of X-ray sources will yield new information on the properties of low mass X-ray binaries and their association with globular clusters. Finally, by producing a large and clean sample, our study will settle the debate on the presence of a break in the X-ray luminosity function of this population.

Dr. Elena Gallo

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Investigators:

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Number of investigators: 3

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Dataset Summary:

Instrument	No. of Datasets	Retrieval Method	Retrieval Plan
ACS	500	FTP	100 dataset/week