

Optical variability studies of ultraluminous X-ray sources

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Ultraulminous X-ray source (ULXs)

- ULXs are extragalactic and non-nuclear source
- X-ray luminosity; $L_x > 10^{39} \text{ erg} \cdot \text{s}^{-1}$
- powered by accretion onto a compact objects
- Possibility of ULXs
 - Intermediate mass black hole ($\sim 10^2 - 10^4 M_\odot$)
 - Stellar mass black hole ($\sim 3 - 20 M_\odot$)
 - Neutron star ($\sim 1.4M_\odot < M_{\text{NS}} < 3M_\odot$)

The scope objectives

study the optical variability of ULXs

Target name	RA (hh:mm:ss)	Dec (dd:mm:ss)	Magnitude
Holmberg II X-1	08:19:29.00	+70:42:19.08	21.6
Holmberg IX X-1	09:57:53.28	+69:03:48.31	22.8
M81 ULS1	09:55:42.2	+69:03:36.5	21.8
M101 ULX-1	14:03:32.37	+54:21:02.75	23.3
NGC 3034 ULX6	09:55:51.33	+69:40:43.65	18.46
NGC 4485 X-1	12:30:30.487	+41:41:42.24	22.2
NGC 4559 X-7	12:35:51.719	+69:03:48.31	23.14
NGC 4935 ULX1	12:26:01.44	+33:31:30.99	22.0
NGC 5204 X-1	13:29:38.61	+58:25:05.55	22.4
NGC 5408 X-1	14:03:19.61	+41:22:58.65	23.0

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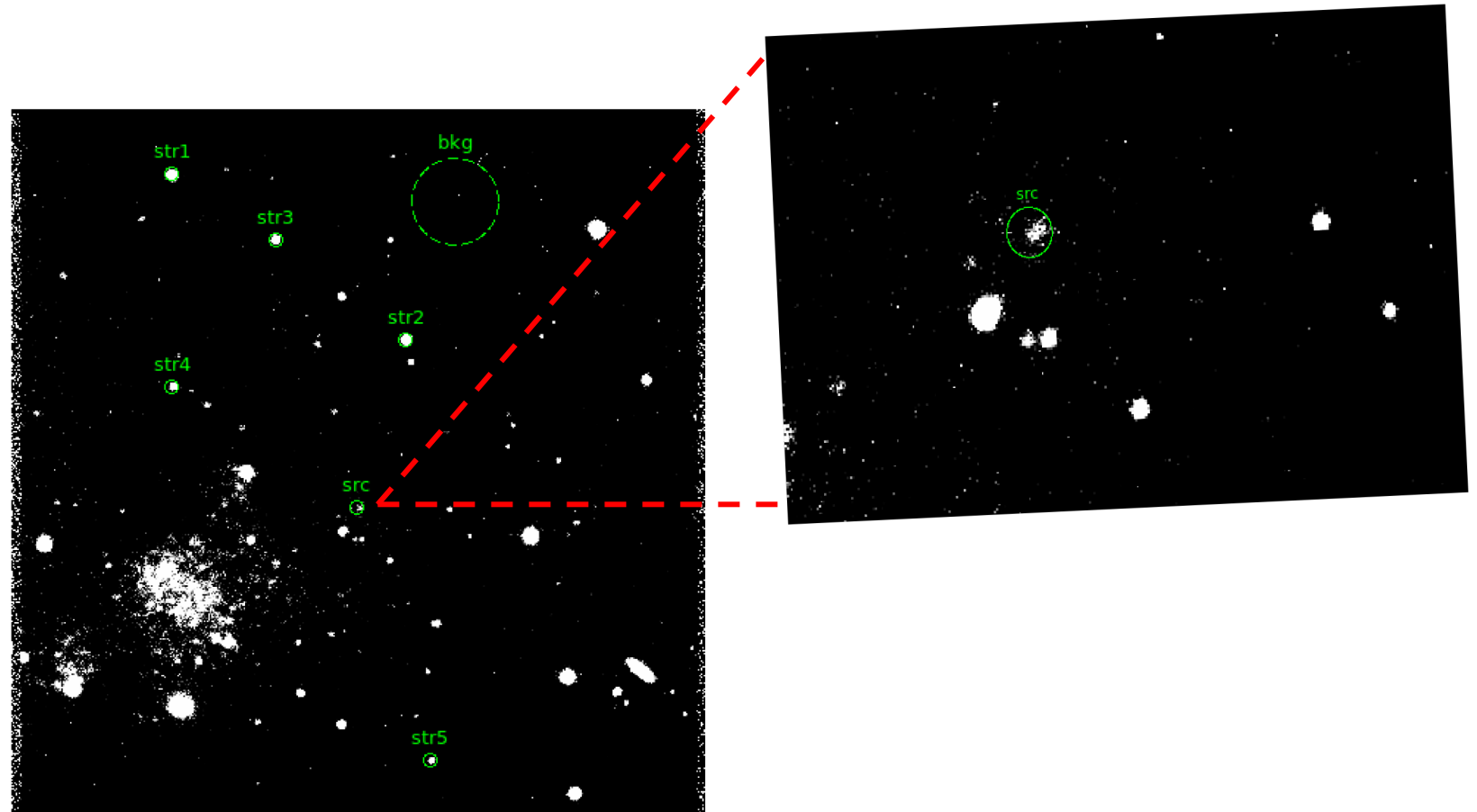


Figure 1: the image of Holmberg IX X-1 obtained by TNO in 2017. The green circle indicates the position of ULXs.

Result

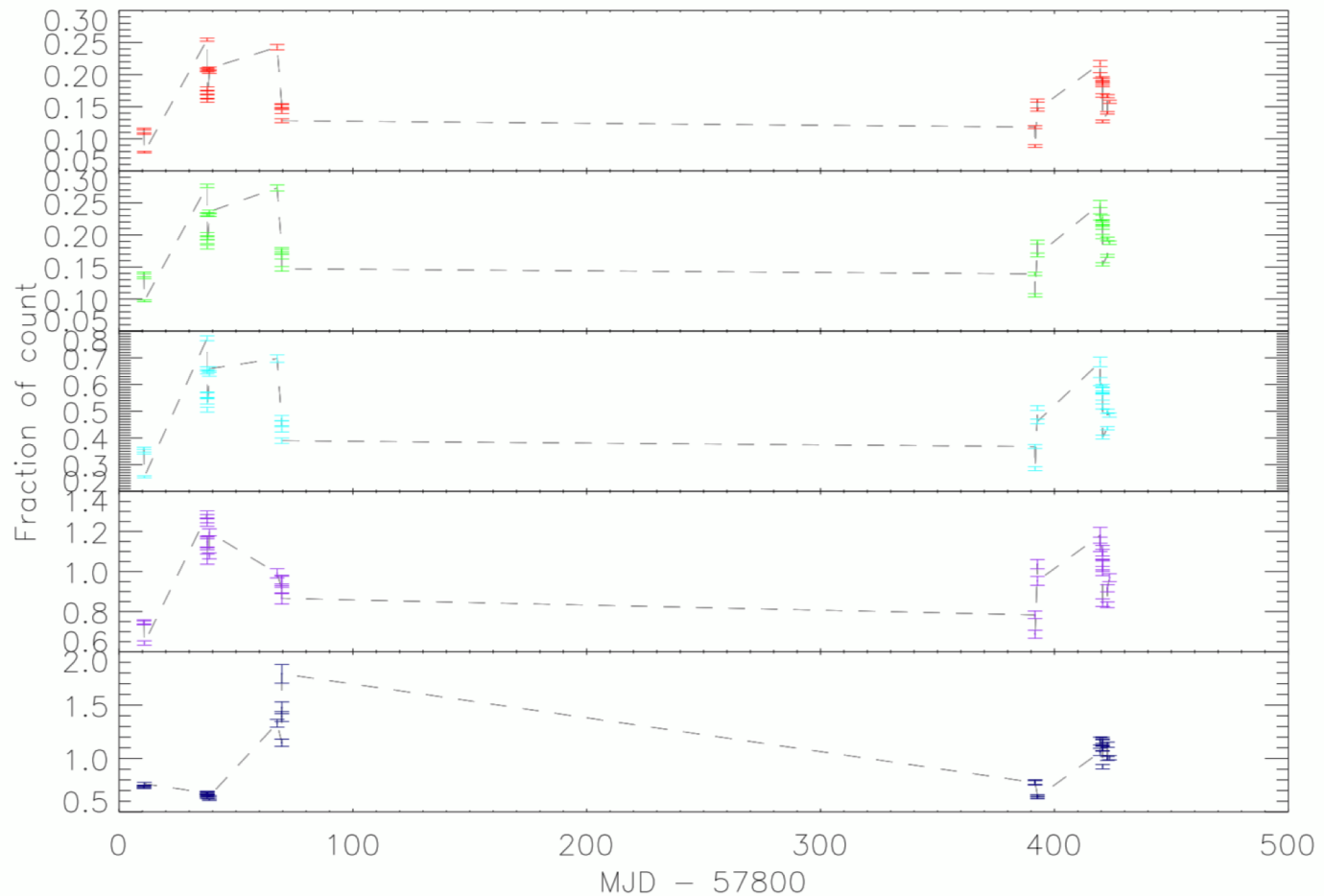


Figure 2: show the light curve of ULX Holmberg IX X-1 obtained from TNO in 2017-2018, reported in form of total ULX counts divided by the counts of reference star.

Further Work

- Collect the data
- Perform the data reduction
- Analyse the data



Thank You !