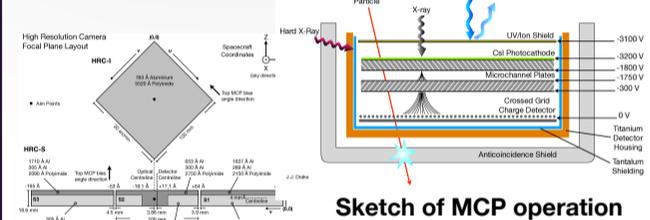


## Abstract

The High Resolution Cameras (HRCs) are micro-channel plate detectors with crossed wire-grid readouts of amplified photoelectrons. The HRC-I is a single flat chip with a large FoV, and the HRC-S is a triplet of chips arranged along the LETG's Rowland circle. Major features include high time resolution (typically msec, up to 16  $\mu$ sec), no pixelization (allowing spatial characterization to  $\ll 0.1$  arcsec), and low-energy sensitivity down to  $\approx 0.07$  keV.

The HRC is thus well suited for studies that require low-energy sensitivity, high timing resolution, and the ability to characterize spatial structures at high resolution. It can observe high count rate sources or measure large intensity variations without pileup. With the LETG, the HRC-S can obtain high-resolution low-energy spectra out to  $\approx 180$  Å, and for the HETG, the HRC-I is preferred for spectral analysis at  $\approx 10$ -25 Å. The bare detector has weak spectral resolution which can distinguish between soft and hard sources, and the variable thickness in the UVIS filter can be used to carry out differential photometry.

## Sketch of HRC geometry

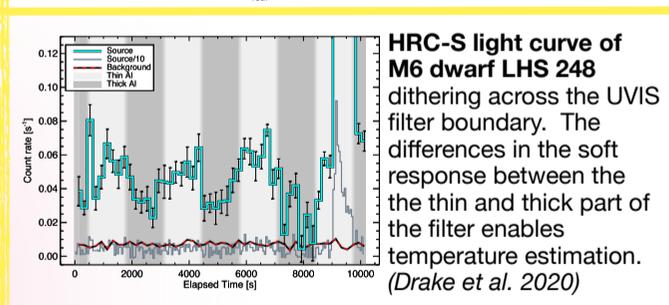
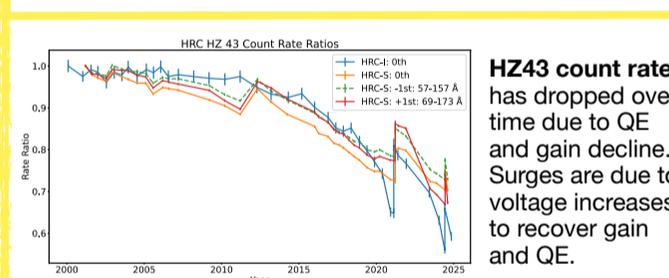
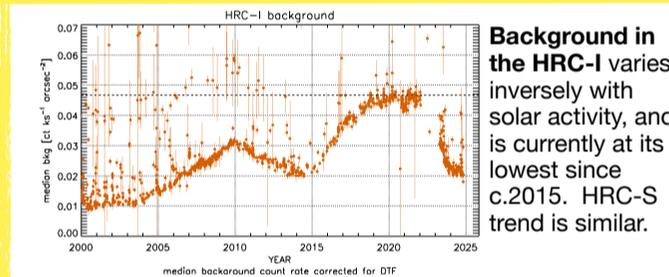
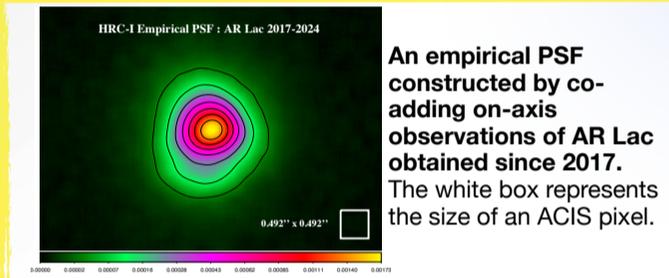
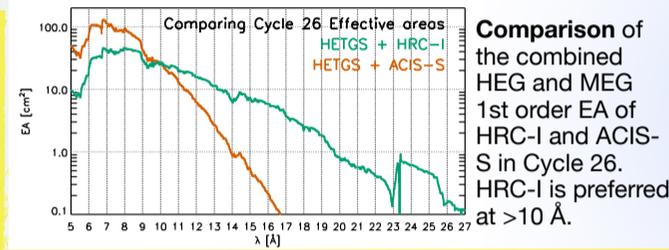
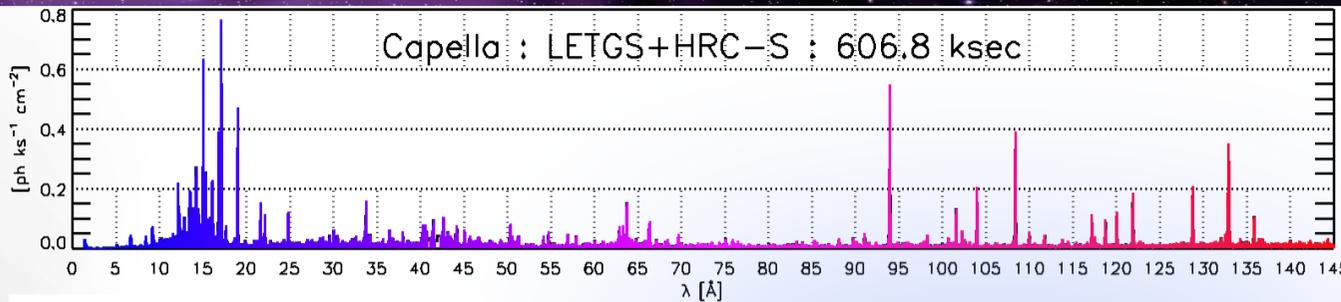


## HRC Basic information

Quantity	HRC-I	HRC-S
Maximum FoV	30'x30'	6'x99'
Best $\delta t$	$\sim 5$ msec	16 $\mu$ sec
Default pixel binning size	0.1318 arcsec pix <sup>-1</sup>	
$\Delta E/E$	6.42938 $\mu$ m	
Telemetry Limit	$\sim 1$ @ 1 keV	
Linearity Limit	185 ct s <sup>-1</sup>	25 ct s <sup>-1</sup>
EA @0.277 keV	5 ct s <sup>-1</sup>	25 ct s <sup>-1</sup>
EA @1 keV	82 cm <sup>-2</sup>	25 ct s <sup>-1</sup>
	184 cm <sup>-2</sup>	216 cm <sup>-2</sup>

## Useful links

- POG Chapter 7 (HRC) : [https://cxc.harvard.edu/proposer/POG/html/chap7.html#tth\\_chAp7](https://cxc.harvard.edu/proposer/POG/html/chap7.html#tth_chAp7)
- POG Chapter 9 (LETG) : <https://cxc.harvard.edu/proposer/POG/html/chap9.html>
- Calibration page HRC : [https://cxc.harvard.edu/cal/Hrc/detailed\\_info.html](https://cxc.harvard.edu/cal/Hrc/detailed_info.html)
- LETG Observers Information : [https://cxc.harvard.edu/cal/letg/detailed\\_info.html](https://cxc.harvard.edu/cal/letg/detailed_info.html)



[Figure below] The phased light curve of eclipsing binary AR Lac (G2 IV + K0 IV) from HRC-I and HRC-S calibration observations since launch, in 400 s bins and color coded in chronological order. Flares are excluded. The baseline quiescent emission is remarkably steady (Drake et al. 2014).

## Science Use Cases

Investigations include solar system charge-exchange and fluorescence emissions from comets, moons, and planets; optically thin multi-million degree plasma from stellar coronae; optically thick thermal emission from white dwarfs and neutron stars; X-ray emitting pulsars; supernova remnant evolution; proper motions of pulsars in SNRs and jet knots in AGNs; etc.

