

SEPTEMBER 15, 2011. – Ordered to be printed
Ms. Mikulski, from the Committee on Appropriations,
submitted the following

REPORT

[To accompany S. 1572]

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Wide Field Infrared Survey Telescope [WFIRST]. – WFIRST was identified as the first priority in the recent astronomy and astrophysics decadal survey. NASA is strongly encouraged to make a request for WFIRST in the fiscal year 2013 that builds on the work of the Joint Dark Energy Mission Project.

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NOVEMMBER 14, 2011. – Ordered to be printed

Mr. Rogers, of Kentucky from the Committee of Conference ,
submitted the following

CONFERENCE REPORT

[To accompany H.R. 2112]

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The Wide Field Infrared Survey Telescope (WFIRST) was identified as the first priority in the recent astronomy and astrophysics decadal survey. NASA should build on the work of the Joint Dark Energy Mission project and should pursue WFIRST to the extent that foreseeable budget resources can accommodate this mission.

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HARDWARE

	WFIRST	Euclid
telescope		
design	1.3-m unobstructed	1.2-m obstructed
entrance pupil	1.327 m ²	0.848 m ²
solar angle	90 ± 36°	90 ± 3°
focal plane		
imaging CCDs (4096 ² pixels)	0	36 × (0'10) ²
imaging HgCdTe (2048 ² pixels)	28 × (0'18) ²	22% × 16 × (0'30) ²
spectroscopic HgCdTe (2048 ² pixels)	8 × (0'45) ²	78% × 16 × (0'30) ²

PROGRAM ALLOCATIONS

program	WFIRST	Euclid
exoplanet microlensing	1.5 years	0 years
guest investigator	1.0 year	0 years
supernovae	0.5 year	0 years
BAO + weak lensing*	2.0 years	5 years

* imaging surveys proceed in parallel

Why is the WFIRST approach preferred for weak lensing?

weak lensing is the riskiest program:

$$\left(\begin{array}{l} \text{uncertainty in local} \\ \text{mean image ellipticity} \end{array} \right) < 0.0002$$

1. Progressive CCD charge transfer inefficiency elongates images.
2. CCDs allow only one very broad “riz” filter; galaxy shapes and PSF vary within bandpass.
3. Requirements on optics and jitter are specified relative to diffraction limit and are a factor of two less demanding in IR.
4. Unobscured design produces cleaner diffraction pattern.
5. Galaxies are less irregular in the red than in the blue.
6. Unless systematic ellipticity errors are within the requirement, additional area provides little or no benefit.

Kocevski et al. <http://www.arxiv.org/pdf/1109.2588>

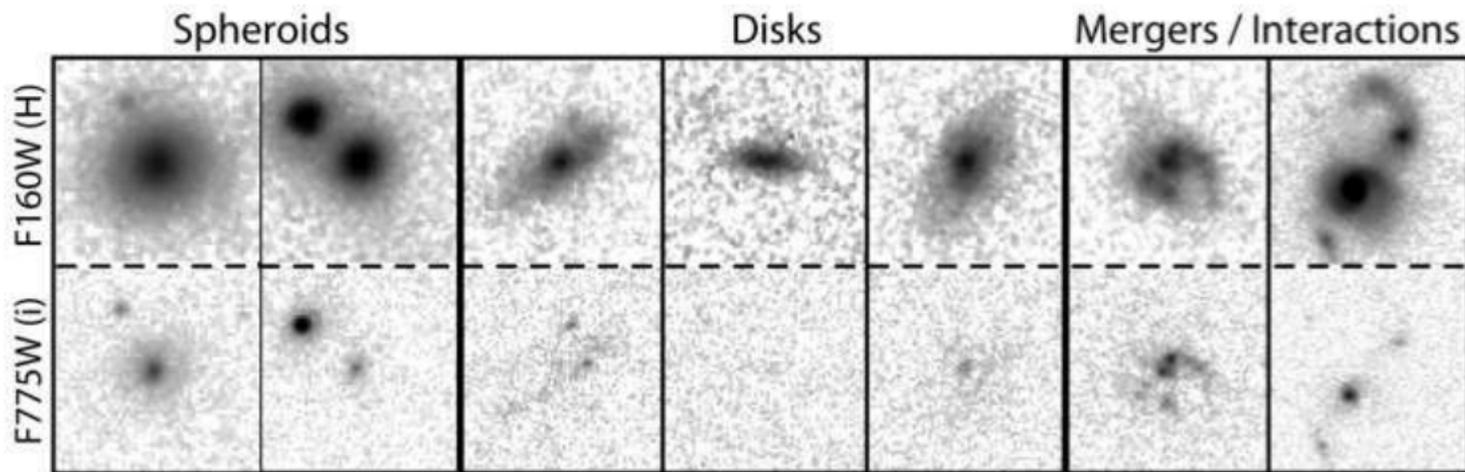


FIG. 3.— Examples of AGN host galaxies that were classified as having spheroid and disk morphologies, as well as two galaxies experiencing disruptive interactions. Thumbnails on the top row are WFC3/IR images taken in the F160W (H) band (rest-frame optical), while those on the bottom row are from ACS/WFC in the F775W (i) band (rest-frame ultraviolet). These images demonstrate that accurately classifying the morphology of these galaxies at $z \sim 2$ requires H -band imaging.