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A Citizen-Science-enabled Comprehensive Search for XUV-disk Galaxies

David A. Thilker

Department of Physics and Astronomy, The Johns Hopkins University,
3400 North Charles Street, Baltimore, MD 21218, USA
email: dthilker@jhu.edu

Abstract. Initial efforts to identify extended UV disk (XUV-disk) galaxies were confined to nearby targets using image products from early in the GALEX mission. We developed a beta Zooniverse-based citizen science project to address this issue, specifically (1) allowing a dramatically larger galaxy sample by crowd-sourcing blink comparison UV-optical image inspection to volunteers, and (2) incorporating all archived GALEX data for each target considered. We aim to widely deploy this project to the public within the upcoming year.

Keywords. galaxies: structure, galaxies: evolution, ultraviolet: galaxies, methods: data analysis

1. Introduction

Early surveys of XUV-disk galaxies (Thilker *et al.* 2007) were limited in scope, both in terms of targets considered and GALEX data used. Consequently, we have not yet fully explored the extant UV imaging for a majority of galaxies in statistically significant local extragalactic samples. Recent years have shown the ability of citizen scientists to undertake detailed image inspection tasks and thus we developed a beta Zooniverse (Lintott *et al.* 2008) project to address this task.

2. Project Description

Our classification interface is accessible online† and is now running in a method evaluation mode. Image inspection is conducted in a guided manner, with the [X]UV threshold contour of T07 overlaid on blinking multi-wavelength data, just as the original classification campaign was completed. Co-added UV imaging for all targets is adaptively smoothed prior to inspection so volunteers can reliably assess the significance of faint outer structures. We are subject to incompleteness / decision bias associated with degraded spatial resolution and sensitivity at increased distance (and lower exposure depth), but with a large sample and uncertainty estimates per classification we can quantify such effects. The outcome of our study will be the most comprehensive census of XUV-disks, including the rarest of objects and with enough confirmed XUV-disks to address potential environmental influences plus cross-correlate with optical morphology/profile type. This assessment of recent star formation activity versus structure of the older stellar disk is a critical missing constraint on our understanding of disk growth and galaxy evolution.

References

Lintott, C. J., *et al.* 2008, *MNRAS* 389, 1179
Thilker, D. A., *et al.* 2007, *ApJS* 173, 538

† www.zooniverse.org/projects/dthilker/outer-limits-xuv-disks/