American Astronomical Society

View Abstract

	CONTROL ID: 3224204
	SUBMISSION ROLE: Late Submission
	DATE/TIME CREATED: May 01, 2019, 03:08 PM
	TITLE: Strong Gravitational Lenses and Where to Find Them: Which Method Should We Be Using?
	Abstract (2,250 Maximum Characters): Strong gravitational lenses are cases where a distant background galaxy is located directly behind a massive foreground galaxy, whose gravity causes the light from the background galaxy to bend around the foreground galaxy. In addition to being visually stunning, these rare events are useful laboratories for furthering our understanding of gravity and to determine properties, such as the mass, of the lensing galaxies themselves. The trouble is finding enough of these strong gravitational lenses for further study. The immensity of the catalogs being collected by state-of-the-art telescopes requires equally innovative methods for interpreting that data. We are interested in three such techniques for identifying strong lenses: mixed spectroscopy, machine-learning, and citizen-science. Spectroscopy involves studying the objects' signatures across the electromagnetic spectrum and is a tried-and-true, reliable method. Machine-learning promises to find more and potentially different cases of lensing through teaching the computer to recognize features of lensing through visual templates. Citizen-science is a broad term for the inclusion of science-enthusiasts in the process of analyzing images on a scale too large to be undertaken by a small team of experts. For the first time, all three detection techniques have been used in the same regions of the sky, where the Kilo Degree Survey (KiDS)

	overlaps three regions of the Galaxy and Mass Assembly (GAMA) survey. We have all three catalogs of strong lenses in hand and plan to analyze the strengths and weaknesses of each method. We expect to uncover inherent biases and advantages to each method in finding a variety of lensing cases, which will serve as a directory for selecting the preferred methods to be used in new research toward these phenomena based upon the characteristics of the target galaxies. With astronomy moving into the era of large-scale imaging surveys, we will need to know which of the three techniques works best for detecting these rare astronomical events.
	PRESENTATION TYPE: Late Submission
	CURRENT SESSION TYPE: Late Poster Submission
	CURRENT CATEGORY: 40. Strong and Weak Gravitational Lensing
	AUTHORS (FIRST NAME, LAST NAME): Shawn M. Knabel[1], Benne Holwerda[1]
	INSTITUTIONS (ALL): 1. Physics and Astronomy, University of Louisville, Louisville, KY, United States.
	Contributing Teams: (none)