Power of the people: Using Zooniverse to power big data astronomy

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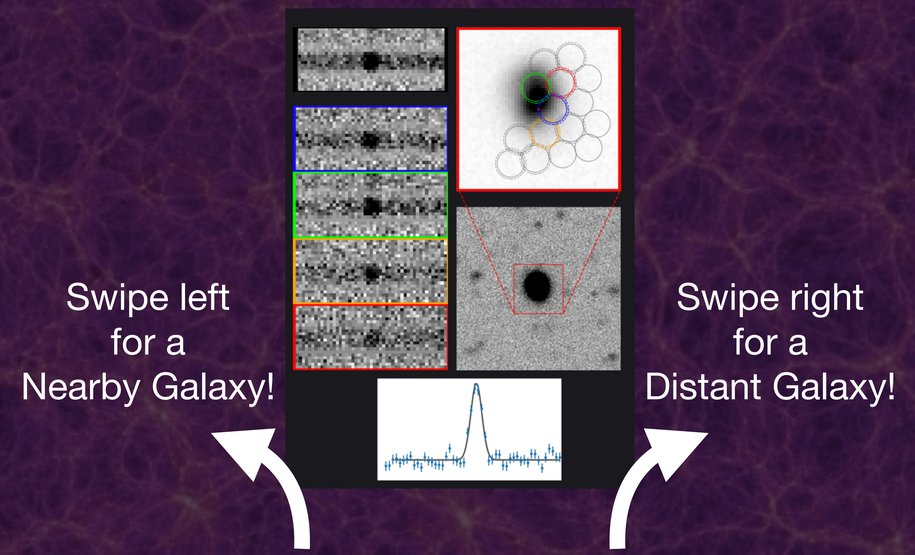
You and your students can be **Dark Energy Explorers**.
Download the Zooniverse app
or scan the QR code.
Create an account to save your classifications!

SCAN ME

How do we **efficiently** classify **millions** of nearby and distant galaxies collected by our telescope, when the classifications are most accurately done by the human eye?



Results

- Almost **2 million galaxy classification**s since launch in early 2021
- 105,000 classifications a week
- 5,000 volunteers all over the world

The success of this project has allowed us to reduce our visual vetting by 90%

In the future, we are working to use the classified objects in machine learning algorithms to cluster by characteristics such as size or magnitude.

What is HETDEX?

Hobby-Eberly Telescope Dark Energy Experiment (HETDEX) will collect data on at least one million galaxies that are 9 billion to 11 billion light-years away, yielding the largest map of the universe ever produced.

The map will allow HETDEX astronomers to measure how fast the universe was expanding at different times in its history.

Changes in the expansion rate will reveal the role of dark energy at different epochs.

Various explanations for dark energy predict different changes in the expansion rate, so by providing exact measurements of the expansion, the HETDEX map will eliminate some of the competing ideas for Dark Energy

HETDEX is a blind survey, meaning that rather than pointing at specific targets, it records everything over a specific patch of sky. Then we go through the data to sift out objects to study.

The Problem

The most difficult task is determining which galaxies come from our distant epoch of interest (10-11 billion years ago at z~2-3) and which ones are nearby. These galaxies, known as Lyman Alpha Emitters (LAEs), are known for brightly emitting at one distant wavelength region. HETDEX will discover at least a million of these. While this is exciting science, it is impractical to visually vet all of these.

The Solution

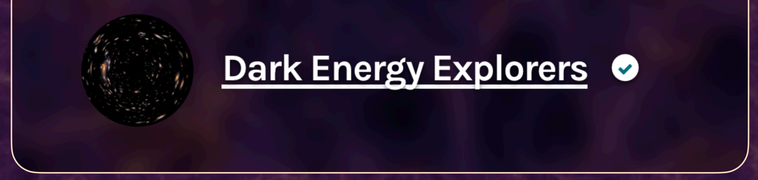
We created Dark Energy Explorers on Zooniverse, the worlds largest citizen science platform to help us classify these astronomical objects. With zooniverse anyone can be a researcher!

Shown in the image in the middle, we train participants with a tutorial to be able to distinguish distant versus nearby galaxies. They then choose a simple binary option by swiping left or right on their mobile device.

References

1. Hobby-Eberly Telescope Dark Energy Experiment. (n.d.). Retrieved from https://hetdex.org/
2. Zooniverse. (n.d.). Retrieved from https://www.zooniverse.org/projects/erinmc/dark-energy-explorers

HETDEX
Hobby-Eberly Telescope Dark Energy Experiment



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Questions?
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