[p29] GALAXY CRUISE: Citizens Classify Galaxies in the HSC-SSP Big Data

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https://galaxycruise.mtk.nao.ac.jp/en/index.html

1. What is GALAXY CRUISE

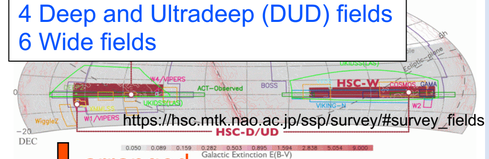
GALAXY CRUISE is the first citizen science project of NAOJ using the HSC-SSP DR2 (released in May 2019) big data.

Citizen Astronomers (non-professionals) access to the website to classify and identify interacting /merging galaxies pre-selected by the "Captain" (Dr. Masayuki Tanaka") to help unlock the mysteries of galaxy evolution.

This project is likened to a cruise ship to set sail for the cosmic ocean and explore the 4 towns (4 DUD fields) and 6 continents (Wide fields) by classifying galaxies.

HSC-SSP Survey Fields

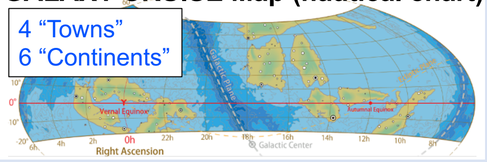
4 Deep and Ultradeep (DUD) fields
6 Wide fields



arranged

GALAXY CRUISE Map (nautical chart)

4 "Towns"
6 "Continents"



3. Mission of Citizen Astronomers and the Latest Status

At the Classification Page (Welcome Page), Citizen Astronomers classify the galaxy in the center of the screen

(1) Spiral or Elliptical -- Same as LESSON 1
(2) Interacting or Not interacting -- LESSON 2
(3) If interacting, Interacting feature(s): "ring(s)," "fan(s)," "tail(s)," or "distortion" -- LESSON 3

GALAXY CRUISE launched: November 1, 2019 (Japanese) / February 19, 2020 (English)

As of February 1, 2021: 6333 Citizen Astronomers from 80 countries & regions registered
Total classification results of galaxies exceeded 1.3 million

G A L A X Y S H O W C A S E

2. Unique Features of GALAXY CRUISE

(1) World's highest quality big data of HSC-SSP

Faint features of interacting/merging galaxies can be (clearly) seen.

(2) Unique world's view + Collecting passport stamps, souvenirs

Citizen Astronomers can collect **departure stamps** on their passports and **souvenirs (illustrations)** while exploring the 4 "Towns" and 6 "Continents" by classifying galaxies.

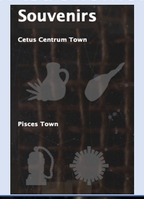
(3) Thorough, easy-to-understand training menu

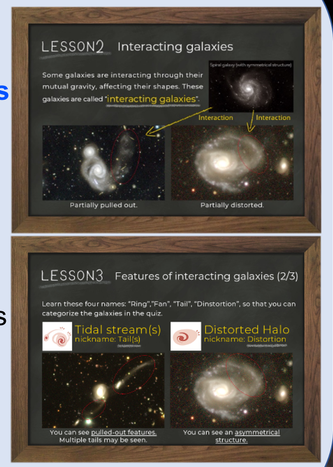
3 steps of **training lessons** + practice course (after logging in)

(4) Exploring the cosmic images

The classification site is based on "hscMap" and Citizen Astronomers can explore the vast cosmic images captured with HSC.

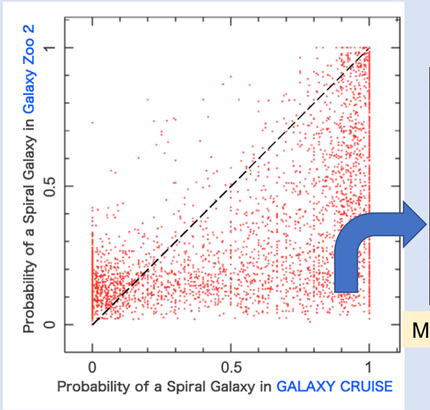
Passport stamps (left) and souvenirs (right)





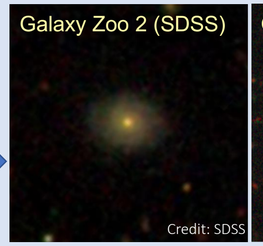
Training Lessons

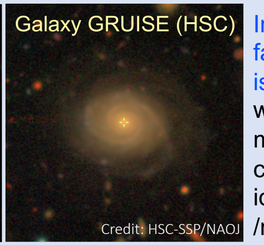
4. Latest Scientific Outputs and Future Plans



The probability (percentage of people) of a galaxy being classified as a spiral in **Galaxy Zoo 2** (vertical axis) against the probably in **GALAXY CRUISE** for each galaxy.

An example of a galaxy in the lower right of the figure (classified as a spiral in GALAXY CRUISE but an elliptical in Galaxy Zoo 2).





In the HSC image, a faint spiral structure is clearly seen. It is worthwhile re-doing morphological classification and identifying interacting /merging features.

More Results: https://galaxycruise.mtk.nao.ac.jp/en/news_e/20210301.html

Future plan:

(1) Scientific analysis with the classification results
(2) "Season 2" with fainter galaxies
(3) Machine learning using AI (artificial intelligence) with classification results as "training data"

*Follow the Twitter accounts @Galaxy_Cruise (Japanese) and @Galaxy_Cruise_e (English)
Twitter Team members: Kei Ito, Chie Tsuchiya, Makoto Ando, Atsuki Kuwata, Suzuka Nakano, Yutaro Kofuji , & Kumiko Usuda-Sato

*Download the original wallpapers at: https://galaxycruise.mtk.nao.ac.jp/en/wallpaper.html