

New polar ring galaxy discovered

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The gri composite image of J0953 taken from the hscMap. Credit: Nishimura et al, 2022.

Japanese astronomers report the detection of a new polar ring galaxy using the data obtained with the Subaru Telescope as part of the Hyper Suprime-Cam Subaru Strategic Program (HSC-SSP). The discovery was detailed in a paper published August 26 on the arXiv pre-print server.

The so-called polar ring [galaxies](#) (PRGs) are systems composed of an S0-like galaxy and a polar ring, which remain separate for billions of

years. In general, these outer polar rings, composed of gas and stars, are aligned roughly in a perpendicular orientation with respect to the major axis of the central host galaxy.

However, although more than 400 PRG candidates have been discovered to date, only dozens of them have been confirmed as real polar ring galaxies by follow-up [spectroscopic observations](#).

Therefore, in order to expand the currently short list of confirmed PRGs, a team of astronomers led by Minoru Nishimura of the Open University of Japan has conducted a detailed study of a sample of known PRGs by using the data from HSC-SSP. In result, they found a new PRG candidate—identified as SDSS J095351.58+012036.1.

"During the course of this search, we have discovered a new PRG candidate SDSS J095351.58+012036.1 (hereafter J0953). This galaxy is located at the edge of the Cosmic Evolution Survey (COSMOS; Scoville et al. (2007)) field," the researchers wrote in the paper.

J0953 was initially identified as a galaxy in 2000 by the Sloan Digital Sky Survey (SDSS). It has a photometric redshift of approximately 0.2, however, given that no spectroscopic observations of J0953 have been performed so far, no spectroscopic redshift of this source is currently available.

According to the study, J0953 has a [stellar mass](#) of about 38.5 billion [solar masses](#) and a star formation rate of some 2.66 solar masses per year. The stellar mass of the host galaxy and the polar structure were found to be 26.18 and 4.23 billion solar masses, respectively. The radius of the host galaxy was measured to be 0.89 arcseconds, while that of the polar structure was found to be 2.12 arcseconds.

The astronomers noted that the polar ring structure of J0953 appears to

be almost perpendicular to the disk of its host galaxy without any disturbed features. They report that the polar structure is blue and probably younger than the host galaxy.

Furthermore, it was found that the Sérsic index of the host galaxy is 2.94, which suggests that the host galaxy has an elliptical galaxy-like structure rather than an exponential disk. The researchers added that it is also possible that the host galaxy is a disk galaxy.

Summing up the results, the authors of the study underlined that more spectroscopic observations of J0953 should be carried out in order to finally confirm its PRG nature. In particular, further investigation of the kinematical properties of both the host galaxy and the polar structure is required.

More information: Minoru Nishimura, Kazuya Matsubayashi, Takashi Murayama, Yoshiaki Taniguchi, A New Polar Ring Galaxy Discovered in the COSMOS Field. arXiv:2208.12388v1 [astro-ph.GA], arxiv.org/abs/2208.12388

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