Jupiter-like exoplanet orbiting nearby star detected

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Israeli astronomers report the detection of a new Jupiter-like exoplanet using the High Accuracy Radial velocity Planet Searcher (HARPS). The newfound alien world orbits a nearby M-dwarf star designated GJ 2126.

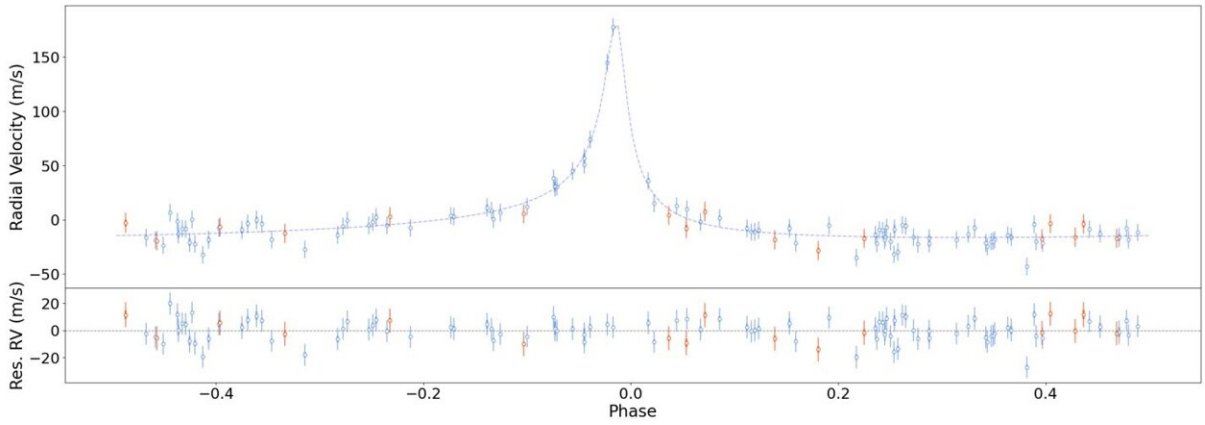
The discovery was announced in a research paper published Feb. 16 on the *arXiv* pre-print server.

The radial velocity (RV) method of detecting an exoplanet is based on the detection of variations in the velocity of the central star, due to the changing direction of the gravitational pull from an unseen exoplanet as it orbits the star. Thanks to this technique, more than 600 exoplanets have been detected so far.

HARPS is a high-resolution visible-light echelle spectrograph installed at the European Southern Observatory (ESO) 3.6-m telescope in Chile. Thanks to its radial-velocity accuracy of about 1 m/s, it is one of the most successful planet finders in history.

Now, a team of astronomers led by Arbel Schorr of the Tel Aviv University in Israel has found another planet based on RV measurements from the HARPS-RVBank database, which contains over 250,000 RVs of 5,239 stars. The HARPS-RVBank database includes all stellar spectra obtained with the HARPS instrument prior to January 2022, available for astronomers to confirm or discover planet candidates.

"We report the discovery of GJ 2126 b, a highly eccentric (e = 0.85) Jupiter-like planet orbiting its host star every 272.7 days. The planet was detected and characterized using 112 RV measurements from HARPS, provided by HARPS-RVBank," the researchers wrote in the paper.



GJ 2126: The RVs phase-folded according to the best-fit Keplerian model (top), and the corresponding residuals (bottom). Blue dots represent pre-fiber upgrade measurements, and orange dots represent post-upgrade ones. Credit: *arXiv* (2025). DOI: 10.48550/arxiv.2502.11139

The study found that GJ 2126 b orbits its host star at a separation of 0.71 AU from it. The planet's mass is estimated to be at least 1.3 Jupiter masses. However, given that the inclination of GJ 2126 b is unknown, its mass could be much greater and the possibility that this object may be a brown dwarf cannot be completely excluded.

Astronomers underline that GJ 2126 b is one of the most eccentric exoplanets discovered around an M-dwarf. They added that the unique properties of GJ 2126 b place it in a relatively sparse region of the detected exoplanet population. Therefore, its further observations could help better understand planetary formation and evolution scenarios.

When it comes to the host GJ 2126, it is a high proper motion star of spectral type M0V, with a radius of about 0.73 solar radii and a mass of around 0.65 solar masses. The star, which is estimated to be at a distance of approximately 124 light years away, has a metallicity at a level of 0.6 dex and its effective temperature is 4,159 K.

Further observations of GJ 2126 b are required in order to determine its radius and to constrain its mass, which would shed more light regarding the composition of this exoplanet.

More information: Arbel Schorr et al, GJ 2126 b: A highly eccentric Jovian exoplanet, *arXiv* (2025). DOI: 10.48550/arxiv.2502.11139

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