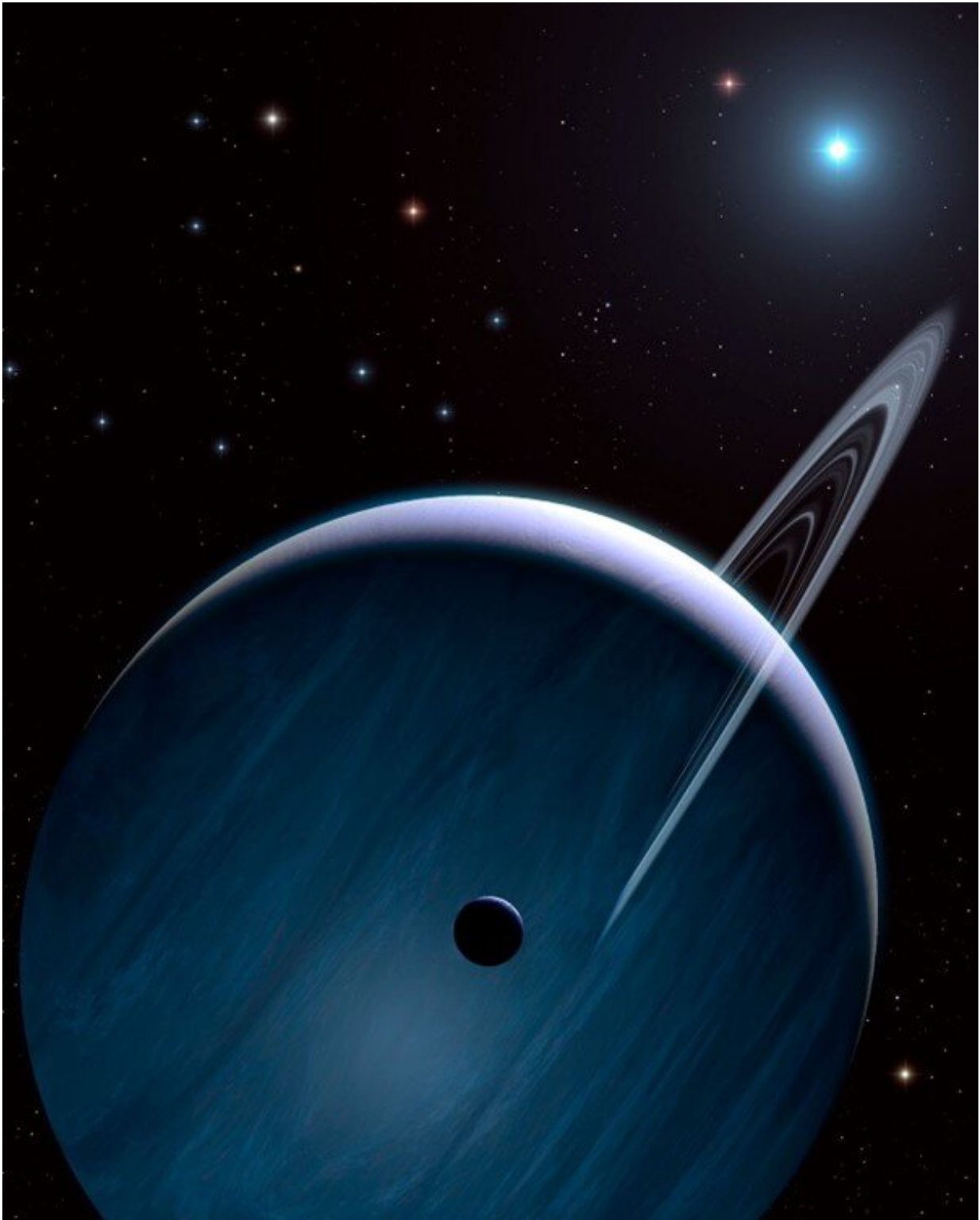


Planetary heist: Astronomers show massive stars can steal Jupiter-sized planets

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Artist's impression of a BEASTie. The image shows a gas giant planet (like Jupiter) on a distant orbit around a blue, massive star. The planet is likely to have

been captured or stolen from another star. The background stars are members of the same star-forming region and could be the star the BEASTie was born around. Credit: Mark Garlick

Jupiter-sized planets can be stolen or captured by massive stars in the densely populated stellar nurseries where most stars are born, a new study has found.

Researchers from the University of Sheffield have proposed a novel explanation for the recently discovered B-star Exoplanet Abundance Study (BEAST) planets. These are Jupiter-like planets at large distances (hundreds of times the distance between the Earth and the sun) from massive stars.

Until now their formation has been something of a mystery, as massive stars emit large amounts of ultraviolet radiation that stops planets from growing to the size of Jupiter—the largest planet in our [solar system](#).

Dr. Emma Daffern-Powell, Co-author of the study, from the University of Sheffield's Department of Physics and Astronomy added, "Our previous research has shown that in stellar nurseries stars can steal planets from other stars, or capture what we call 'free-floating' planets. We know that massive stars have more influence in these nurseries than sun-like stars, and we found that these massive stars can capture or steal planets—which we call 'BEASTies.'

"Essentially, this is a planetary heist. We used [computer simulations](#) to show that the theft or capture of these BEASTies occurs on average once in the first 10 million years of the evolution of a star-forming region."

Dr. Richard Parker, Lecturer in Astrophysics in the University of

Sheffield's Department of Physics and Astronomy explains, "The BEAST planets are a new addition to the myriad of exoplanetary systems, which display incredible diversity, from planetary systems around sun-like stars that are very different to our Solar System, to planets orbiting evolved or dead stars

"The BEAST collaboration has discovered at least two super-Jovian planets orbiting massive stars. Whilst planets can form around [massive stars](#), it is hard to envisage gas [giant planets](#) like Jupiter and Saturn being able to form in such hostile environments, where radiation from the stars can evaporate the planets before they fully form.

"However, our simulations show that these planets can be captured or stolen, on orbits very similar to those observed for the BEASTies. Our results lend further credence to the idea that [planets](#) on more distant orbits (more than 100 times the distance from Earth to sun) may not be orbiting their parent star."

The research, now published in *Monthly Notices of the Royal Astronomical Society: Letters*, was conducted by Dr. Richard Parker and Dr. Emma Daffern-Powell at the University of Sheffield and is part of a larger research program which aims to establish how common planetary systems like our own are in the context of the many thousands of other [planetary systems](#) in the Milky Way galaxy.

More information: Richard J Parker et al, Making BEASTies: dynamical formation of planetary systems around massive stars, *Monthly Notices of the Royal Astronomical Society: Letters* (2022). [DOI: 10.1093/mnrasl/slac086](https://doi.org/10.1093/mnrasl/slac086)

Provided by University of Sheffield

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