Researchers spot Saturn-sized planet in the “Einstein desert”

Most of the exoplanets we’ve discovered have been in relatively tight orbits around their host stars, allowing us to track them as they repeatedly loop around them. But we’ve also discovered a handful of planets through a phenomenon that’s called microlensing. This occurs when a planet passes between the line of sight between Earth and another star, creating a gravitational lens that distorts the star, causing it to briefly brighten.

The key thing about microlensing compared to other methods of finding planets is that the lensing planet can be nearly *anywhere* on the line between the star and Earth. So, in many cases, these events are driven by what are called rogue planets: those that aren’t part of any exosolar system at all, but they drift through interstellar space. Now, researchers have used microlensing and the fortuitous orientation of the Gaia space telescope to spot a Saturn-sized planet that’s the first found in what’s called the “Einstein desert,” which may be telling us something about the origin of rogue planets.

Going rogue

Most of the planets we’ve identified are in orbit around stars and formed from the disks of gas and dust that surrounded the star early in its history. We’ve imaged many of these disks and even seen some with evidence of planets forming within them. So how do you get a planet that’s not bound to any stars? There are two possible routes.

The first involves gravitational interactions, either among the planets of the system or due to an encounter between the exosolar system and a passing star. Under the right circumstances, these interactions can eject a planet from its orbit and send it hurtling through interstellar space. As such, we should expect them to be like any typical planet, ranging in mass from small, rocky bodies up to gas giants. An alternative method of making a rogue planet starts with the same process of gravitational collapse that builds a star—but in this case, the process literally runs out of gas. What's left is likely to be a large gas giant, possibly somewhere between Jupiter and a brown dwarf star in mass.

https://arstechnica.com/science/2026/01/researchers-spot-saturn-sized-planet-in-the-einstein-desert/