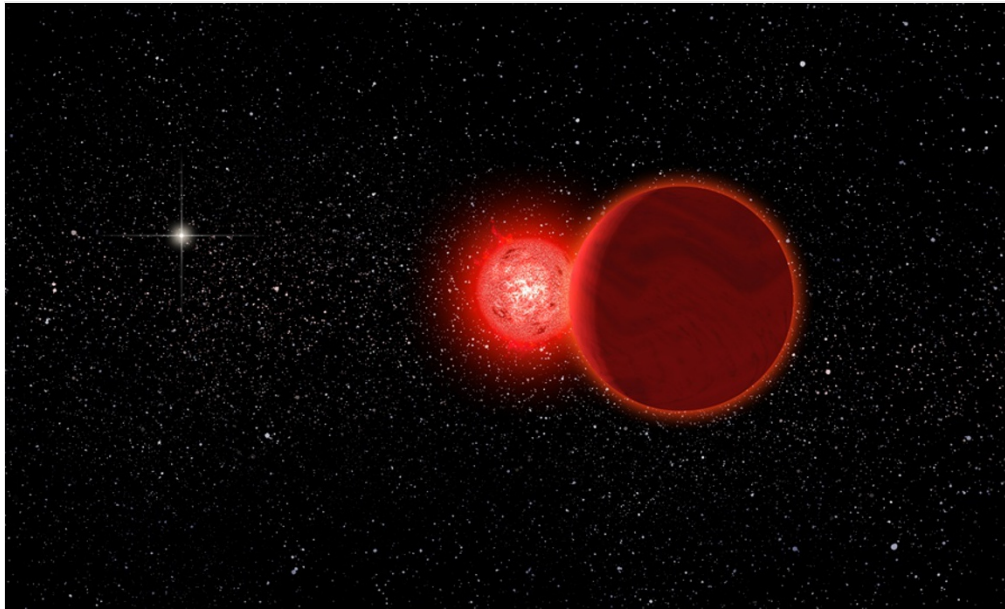


Star buzzed Solar System during human prehistory

Faint star with even fainter companion came close enough to perturb comets in the distant Oort cloud some 70,000 years ago.

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Artist's impression by Michael Osadciw/Univ. of Rochester

A red dwarf and its brown dwarf companion flew by at less than 1 light year's distance around 70,000 years ago — relatively recently for a type of encounter that is estimated to take place only about once every 9 million years.

A recently discovered stellar neighbour of the Sun penetrated the extreme fringes of the Solar System — the closest encounter ever documented — at around the time that modern humans began spreading from Africa into Eurasia.

During occasional flare-ups that may have lasted minutes to hours, the dim interloper might even have been bright enough for our ancestors to see.

The red dwarf star, which has a mass about 8% that of the Sun and is orbited by a 'brown dwarf' companion — a body with too little heft to sustain the thermonuclear reactions that enable stars to shine — was discovered in 2013 in images recorded by NASA's Wide-field Infrared Survey Explorer (WISE) mission. It is relatively nearby, at about 6 parsecs (19.6 light years) away.

Astronomer Eric Mamajek at the University of Rochester in New York became intrigued by it when he learned that the faint object is moving slowly across the sky, but its radial velocity — the rate at which it is moving away from an observer — is high. That indicated that the low-mass star, nicknamed Scholz's star after the German astronomer who discovered it, is racing almost directly away from the Solar System.

Close encounter

Tracing the trajectory of the star and its brown dwarf companion back in time, Mamajek's team found with 98% confidence that Scholz's star passed within the Solar System's Oort cloud, a reservoir of comets, about 70,000 years ago.

The star sped through the outer Solar System at 83 kilometres per second, and came within 0.25 parsecs of the Sun (or 52,000 times the Earth–Sun distance), the team reports in the 10 February issue of *Astrophysical Journal Letters*¹. By comparison, the closest star to the Solar System known today, Proxima Centauri, lies 1.3 parsecs from the Sun. The encounter is the closest-known passage of a star that has a well-documented velocity and distance, the team says.

"The result is almost certainly correct, as predicting the nearly straight-line motion of nearby stars is a well-understood calculation," says astronomer Adam Burgasser of the University of California, San Diego, who was not involved in the study.

"The discovery is surprising," adds astrophysicist Scott Tremaine at Princeton University in New Jersey, because stars are expected to come close to the outer Solar System only about once every 9 million years, yet this encounter occurred recently.

Because Scholz's star is puny and sped by quickly, it would have had a negligible impact on the Oort cloud, Mamajek notes. And any comets that the star might have sent hurtling towards the inner Solar System will not arrive for another few hundred thousand years, says Tremaine. However, more-massive stars penetrating the Oort cloud in the distant past might have triggered major comet showers that pummelled the planets and led to some of the mass extinction events on Earth, says Mamajek.

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References

1. Mamajek, E. E. *et al. Astrophys. J. Lett.* **800**, L17 (2015).