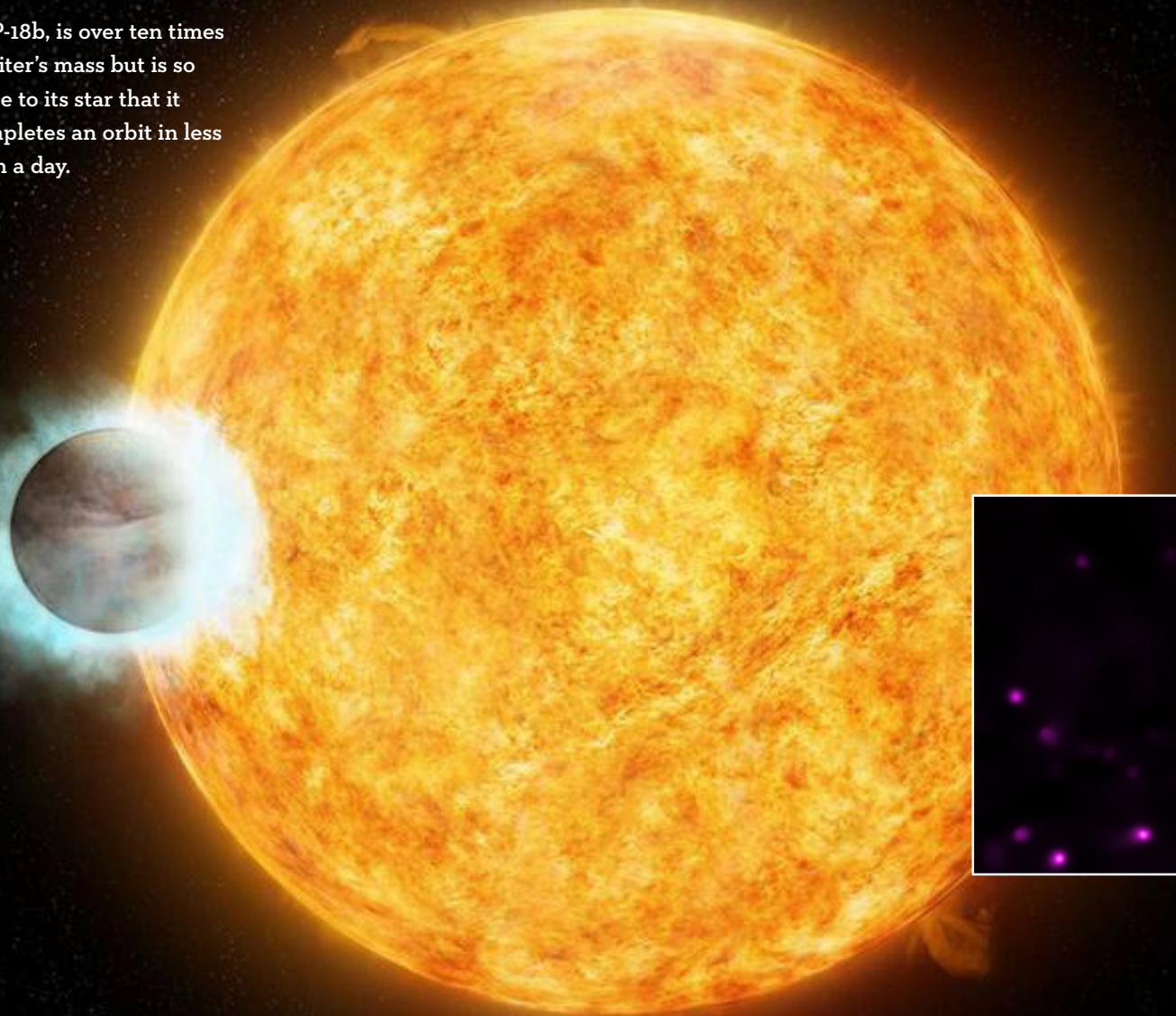




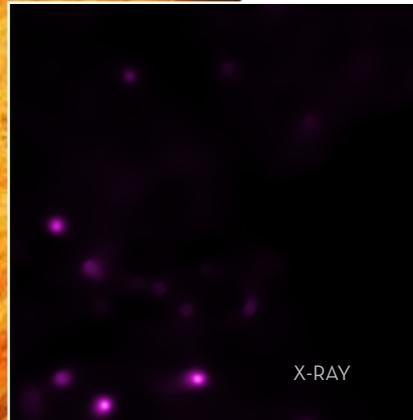
# exoplanets

Auroras can be spectacular and beautiful. Known better in the Northern Hemisphere as the “Northern Lights,” these colorful light shows are generated by storms on the Sun. They are also reminders of the impact that our Sun, some 93 million miles away, can have here on Earth. What does this have to do with planets outside our solar system?

ASP-18b, is over ten times Jupiter's mass but is so close to its star that it completes an orbit in less than a day.



ILLUSTRATION



X-RAY

As astronomers find more and more planets around other stars – what scientists call “exoplanets” – they are learning that some planets do, in fact, influence the fate of the star they orbit. Take, for example, the exoplanet called WASP-18b. This planet is located about 330 light years from Earth. It has a mass of about ten times that of Jupiter, but it orbits its star incredibly closely. In fact, WASP 18-b goes around its star once every 24 hours. Compare that with the 365 days it takes Earth to make one orbit around the Sun or the 88 days that it takes Mercury to complete its orbit.

Using NASA's Chandra X-ray Observatory, scientists are beginning to find out what this kind of proximity does to both the planet and the star. Astronomers know that the star in this system, called WASP 18, is between 500 million and 2 billion years old. This is quite young by astronomical standards. And young stars are active stars that give off a lot of X-ray light. When astronomers observed

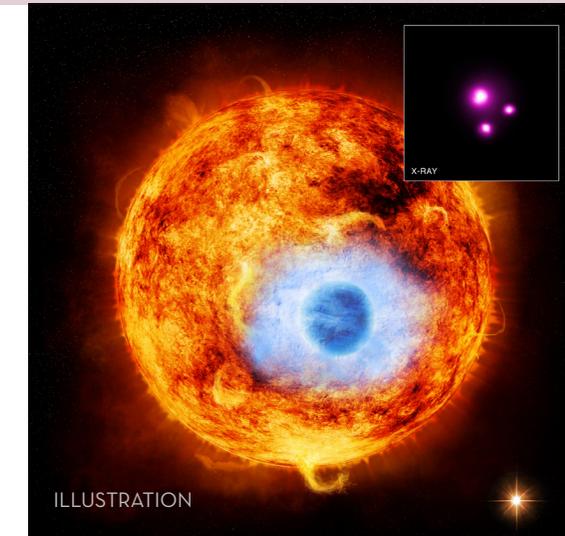
**Light year:** the distance that light, moving at a constant speed of 300,000 km/s, travels in one year. One light year is just under 10 trillion kilometers.

WASP 18, however, they didn't see any X-rays coming from the star. So, WASP 18 is about 100 times less active than it should be for its age.

What's happening here? Scientists think the intense gravity created by having a giant planet so close to the star is wreaking havoc on the internal structure of the star. This means that the planet in this system is making the star old before its time.

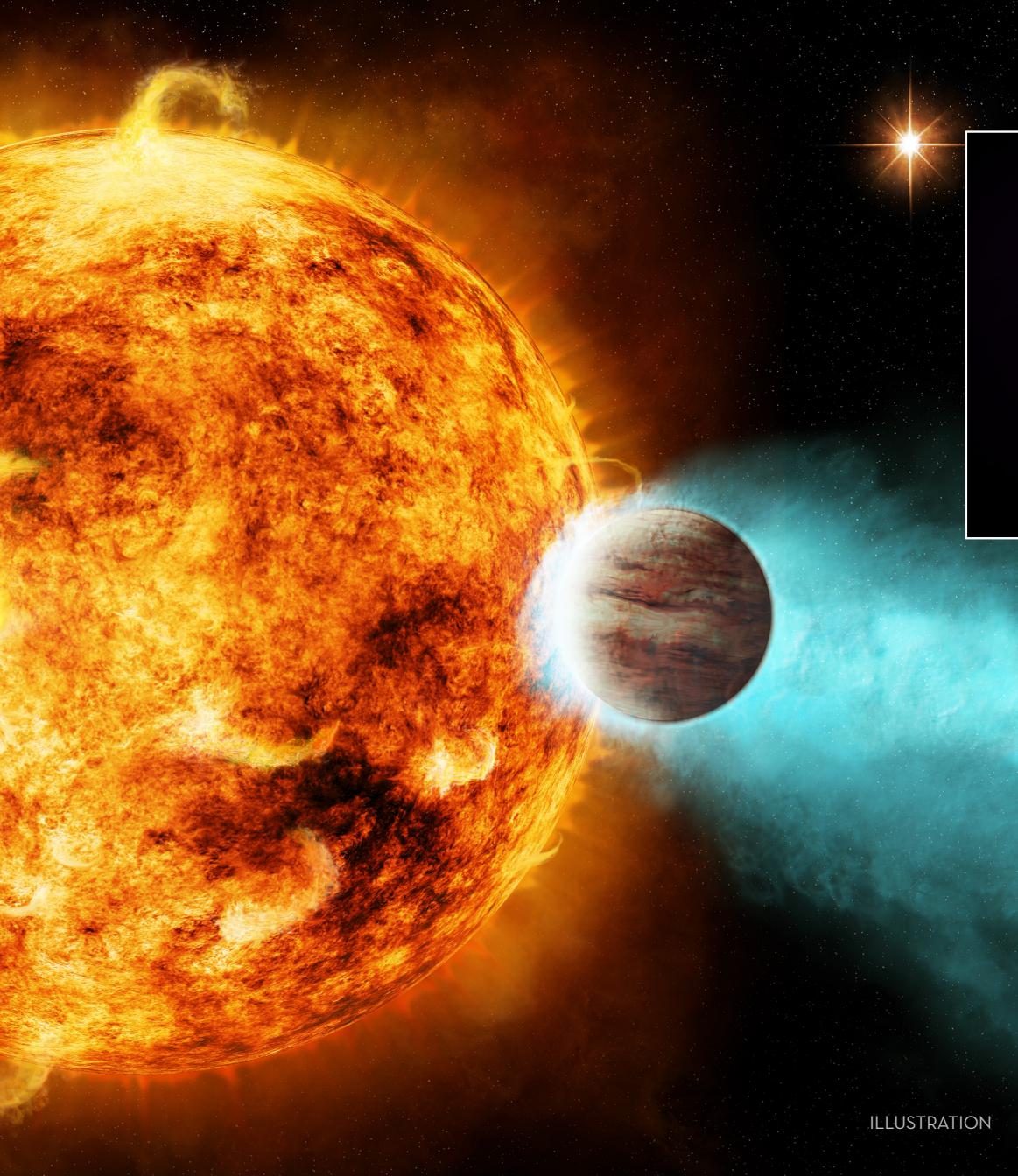
Is this always the case with these kinds of planets? Chandra and other observatories have discovered that the answer is no. If the star has a different internal structure, these close-in giant planets actually have the opposite effect, making the star act younger than astronomers believe it really is. Examples of these cases include HD 189733 and CoRoT-2a, both of which Chandra has also observed.

Scientists are finding that planetary systems are amazingly diverse. NASA's Chandra, which was designed and built before this explosion of exoplanet discovery, is proving to be an excellent tool to learn about these distant worlds and the stars they orbit.



ILLUSTRATION

^ This graphic depicts HD 189733b, the first exoplanet about the size of Jupiter caught passing in front of its parent star in X-rays.



X-RAY

< This is an illustration of a nearby star, named CoRoT-2a, which has a planet in close orbit around it. It's blasting a planet in its orbit with an extremely high level of X-rays.

ILLUSTRATION