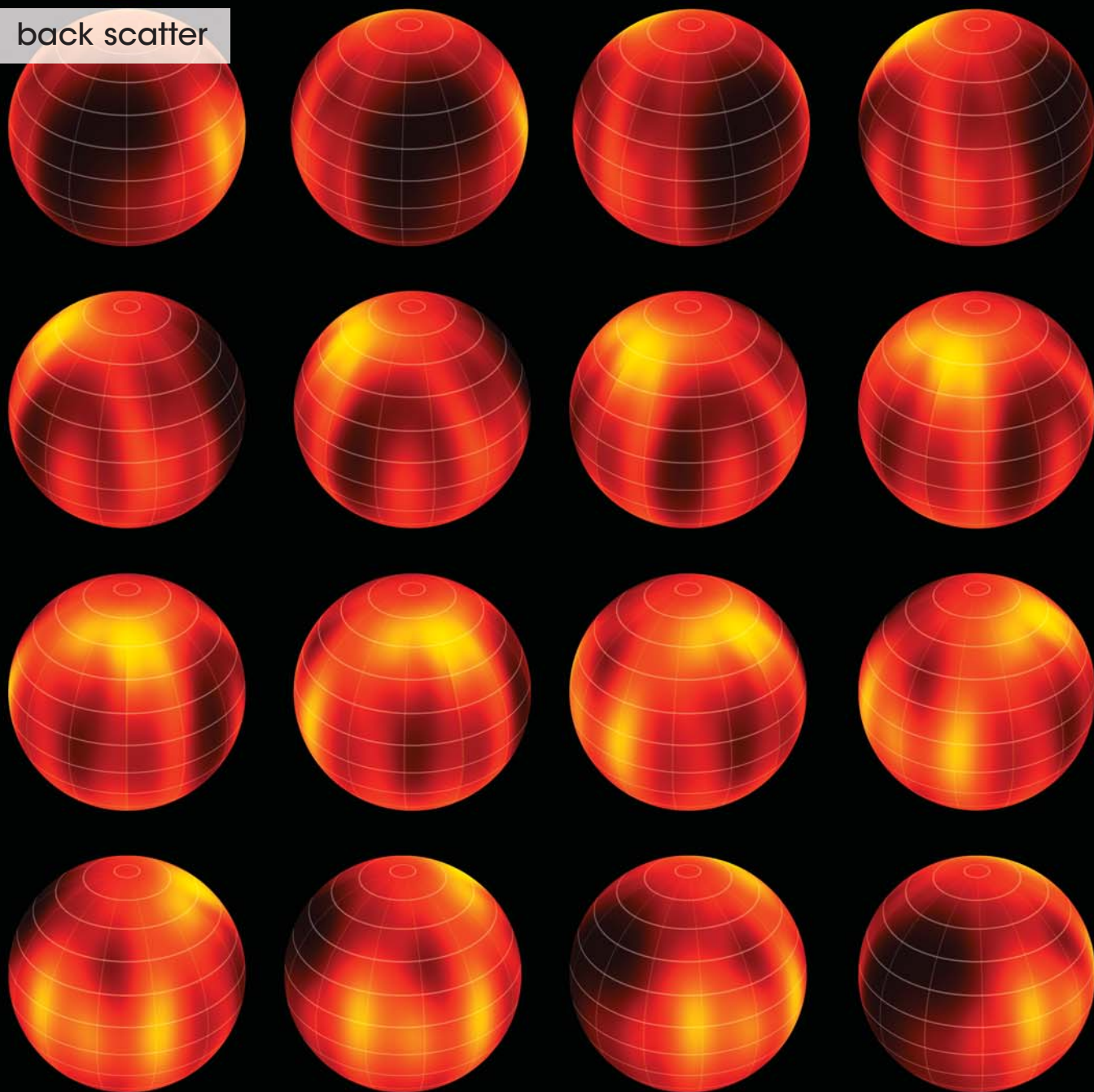




A brown-dwarf weather map

Brown dwarfs fill the gap between giant gas planets and faint cool stars. Lacking enough mass to initiate nuclear fusion in their cores, they are bright only at IR wavelengths. Just one year ago, Kevin Luhman of the Pennsylvania State University discovered a pair of brown dwarfs a mere $6\frac{1}{2}$ light-years away, making them the third closest star system to Earth. Thanks to that proximity, the pair—dubbed Luhman 16A and 16B—are the first brown dwarfs bright enough to be studied with high precision and spectral resolution.

Capitalizing on that opportunity, a team of astronomers led by Ian Crossfield at the Max Planck Institute for Astronomy has created the first global map of a brown dwarf. These 16 projections show the surface of Luhman 16B (the fainter yet more variable of the two) over the course of one full 4.9-hour rotation. To produce the map, the researchers used Doppler imaging, a technique that extracts latitude and longitude information from rotation-induced shifts in absorption lines. The bright and dark regions likely are areas of thin and thick cloud cover (similar to the clouds evident in IR images of Jupiter). Future observations of Luhman 16A and 16B and other brown dwarfs—and of giant exoplanets, thought to have similar atmospheres—will allow multiwavelength global mapping and studies of atmospheric circulation and chemistry in exotic environments. (I. J. M. Crossfield et al., *Nature* **505**, 654, 2014. Image by ESO/I. Crossfield, submitted by Ian Crossfield.)

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