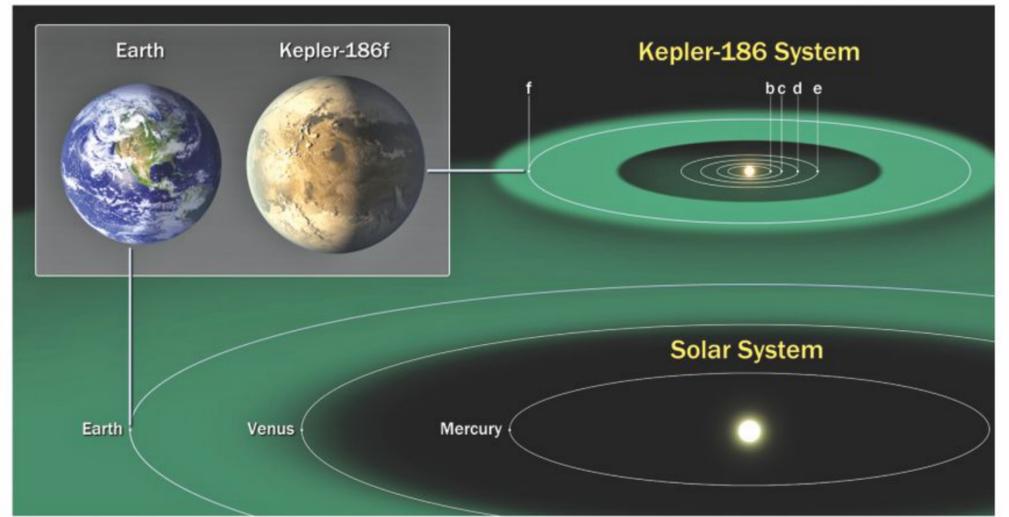


Oxygen, hydrogen, nitrogen and carbon—the four elements necessary for life to flourish anywhere. Take one away, the balance is off, and the lovely blue ball floating in space that we call home is likely to become a barren wasteland. The Earth being blue has significance too—no matter where you look, you will not find a single living organism that can survive without water; not even the toughest bacteria living in the most arid of conditions can go without the clear, tasteless stuff.

our galaxy. Pointed at the Cygnus and Lyra constellations, the Kepler has so far been successful in identifying 2,337 confirmed planets and 4,496 candidate exo-planets by a method called “Transit”. Using this method, Kepler can determine the size of the planet, duration of orbit and its distance from the star—giving the team working with Kepler an idea of how hot or cold the planet might be, as well as the tools to make a rough estimate of what its topology and terrain might look like.

The working principle is fairly simple.



# ENSNARING EARTH-LIKE PLANETS WITH THE KEPLER

SHAER REAZ

Why this checklist of things needed for living things to be alive? Since 2012 we have been bombarded by news of “Earth-like” planets being discovered, throwing news outlets relying on clickbait into a furious frenzy of speculation. Largely thanks to the space observatory Kepler, these new planets have been a source of interest for astronomers, sci-fi fans and anti-environmentalists who harbour hopes that we are not really destroying our planet, and even if we are, there are other places to settle in and eventually ruin. However, those who are working with Kepler since it was launched into space in 2009 have just one specific target—finding new planets.

Called a planet-hunter, the Kepler telescope is different from the veteran space viewfinder that is Hubble—while the Hubble casts a wide gaze on the cosmos and gives us valuable information on everything from black-holes to large scale events like the death of a star, the Kepler casts a much narrower net in order to ensnare planets and star systems in just one direction of



Despite what parents tell their kids, Kepler's job description involves continuously staring at distant stars similar to our sun. Whenever a planet passes in front of its local star while in orbit, the light intensity from the star

dips—the planet is in transit. If it is indeed a planet in orbit, it will come around, and if it registers the same dip in intensity as before, it is considered a candidate planet. If it registers a third time, it is upgraded to a confirmed planet. The time it takes to register each dip in light intensity is the time the planet takes to orbit. From all that, the Kepler mission team can analyse the data and determine its size, shape and predicted topography.

All the 30 Earth-like planets that have been identified by Kepler so far lie in what astronomers call “the Goldilocks zone”. Like Goldilocks' porridge, this zone is the perfect compromise between hot and cold, just like our planet is neither too hot like Venus nor too cold like Mars. The benefits of being a planet in the Goldilocks zone extends to its ability to hold water—if the planet was too far from its sun and thus too cold, any water on or near the surface would freeze, while too hot a planet would turn all the water into steam. Since we know that life struggles to take hold when there is a lack of water, it should be no surprise that these Earth-like planets in the Goldilocks zone are of special interest to anyone intent on proving we Earthlings are not alone in the universe.

The focus at this point is not to determine whether these planets can be colonised, nor is it to find extra-terrestrial life. The Kepler mission merely identifies

planets—finding habitable planets in the liveable zones of star systems is just a bonus. The implications are profound though—every time a planet is identified to be Earth-like, it increases humanity's chances of stumbling upon biological life outside our own solar system. We will not actually see it though, and the actual discoveries will certainly be very different from what we expect after years of sci-fi and Hollywood indoctrination—most scientists believe that our first discoveries of alien life may amount to nothing more than single-celled bacteria or microscopic organisms. Even then, it would be a groundbreaking discovery, proving beyond a doubt that Earth is not the only planet with biological life. It stands to reason that if a planet is in the habitable zone of a star system and has the right amounts of oxygen, hydrogen, nitrogen and carbon, plant and animal life will most likely evolve.

The Kepler spacecraft operated successfully till May 2013. The replacement, K2, has been operational since May 2014 and is expected to be retired sometime next year. It will be replaced as well, and the fascinating discoveries will no doubt continue. Some may see it as an astronomical waste of resources, but when it comes to knowing more about the cosmos and the universe that hosts us, no price is too high.

Shaer Reaz is the In-charge of Shift, the automotive publication of The Daily Star.

## মাদার নতুন নাম

কালার গার্ড

কাপড়ের রঙকে রাখে নতুনের মতো বাক্বাকে

মাল্টি বুস্টার

কাপড়ের যে কোন দাগ-ময়লাকে নিমিষেই দূর করে

সবচেয়ে ফাস্ট, সবচেয়ে কার্যকরী ..