Research Notes

The Radial Velocity Method is a technique used to detect planets by measuring the Doppler shift in a star's spectral lines through the gravitational influence of an orbiting planet. This is because a star/planet will never remain completely stationary when it is orbited because of the force exerted(Planetary Society). As a planet orbits its star, it induces a wobble in the star's motion along its line of sight. Using a very sensitive spectrograph, astronomers can track shifts in the star's wobble making the star appear more blue or more red. By observing these changes in the planet's radial velocity we expect to see a static change in the redness/blueness of a star, indicating that the star is being orbited(Planetary Society), scientists can identify a couple of things about said planet; the presence, mass, and orbital period. This method has successfully discovered multiple planets and contributed to our understanding of planetary systems beyond our own.

On the other hand, the Transit Method involves observing a star for dimming in its light from a planet passing in front of it. When a planet moves in front of its host star, it blocks a portion of the star's light, causing the brightness from the host star to dim. If we keep track and look for these periodic dims, we can find lots of information about the planet, including its size, orbital period, and distance from the host star. Based on things like transit depths, we can identify a planet size where the smaller depth is a smaller size and a larger depth to a larger planet size. As well as size, the distance of a planet can be tracked by the transit duration, where the shorter the duration the closer a planet likely is. The Transit Method has proven to be a valuable tool for identifying and characterizing more than 3000 planets (NASA), especially those aligned with our line of sight.

The Radial Velocity and Transit Method both have been very important to the development of our understanding of planets and their diversity. Where the Radial Velocity Method helps us understand a Planet's mass and orbit(Shostak), the Transit Method helps us understand a planet's size and atmosphere(Shostak). Using both these methods helps scientists verify findings from each method and leads to confirmations and a deeper understanding of our planets. Overall, both these techniques have helped us expand our knowledge of planets and worlds beyond our solar system.

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