**Astrometric Detection**

**HOW IT WORKS**
Astrometric detection measures the position of different stars in the sky over long periods of time. It measures any unusual changes in the position to determine whether a planet is orbiting a star.

**ADVANTAGES**
Astrometric detection works by measuring the movement of planets, so the giant planets with larger orbits are generally the best to target. Also, it can measure the mass of planets.

**DISADVANTAGES**
The time constraints imposed by the comparatively small length of space missions will prevent astrometric detection for planets with longer orbital periods.

**FUTURE OF ASTROMETRY**
Astrometric detection, although used today, is much more successful when observations are made from space. Therefore, this technique will discover many extrasolar planets with an increased amount of observatories or telescopes in space.

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**Detection Interaction**

When findings discovered by astrometric detection are combined with that of Doppler, a planet’s orbital elements and history.

When the transit method (which measures size) is used with the Doppler method (which measures mass), density of planets may be determined.

The Doppler method is used to verify any discoveries found by the transit method.

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**Discoveries**

Direct imaging discovered an extrasolar planet in 2004 called Fomalhaut B.

The first discovery of extrasolar planets was in 1992. These three planets orbit a star named PSR 1257+12.

**Detecting Extrasolar Planets**

What else is out there?
Transit Detection

HOW IT WORKS
Transit detection works by measuring how much light is blocked from a star when the planet aligns in front of it. This allows the radius of the planet to be derived.

ADVANTAGES
Since alignment of the star with the planet may be difficult, smaller planets are more easily studied. Additionally, the smaller a planet's orbit, the increased success of transit detection.

DISADVANTAGES
Because it is difficult to perfectly align a planet with its parent star, larger planets with larger orbits are the most difficult to detect with this technique.

FUTURE OF TRANSIT DETECTION
Transit detection is groundbreaking because it allows astronomers to study the atmosphere and the temperatures of different planets. Moreover, the physical structure of extrasolar planets can be studied with the rise of transit detection.

Doppler Detection

HOW IT WORKS
Doppler detection uses a method of measuring the changes in the speed of a star to determine whether a planet is orbiting it affecting its gravitational pull. This is why this method is also called Radial Velocity.

ADVANTAGES
The planets most easily discovered by the Doppler effect are those which are large, with small orbits, and closer to the Earth. This is because this method requires the observation of the deviation in velocity of a planet. Because any variation in the velocity will seem smaller.

DISADVANTAGES
The technique of Doppler detection gets harder to use as you are further from a planet or have larger orbits. Any variation in the velocity will seem smaller.

FUTURE OF DOPPLER DETECTION
Doppler detection has proven to be the best method of detecting extrasolar planets. The better technology developed for telescopes, the smaller amount of change in velocity can be detected, therefore detecting more extrasolar planets.

Direct Imaging

HOW IT WORKS
Direct imaging is used by directly detecting the planets through seeing them and their light through telescopes.

ADVANTAGES
Direct imaging works best on planets that have large orbit and are farther from their parent star. This is because if a planet has a smaller orbit, the light emitted from the planet will be lost in the light from the star.

DISADVANTAGES
The main disadvantage of direct imaging would be that smaller orbiting or dim stars cannot be detected by direct imaging.

FUTURE OF DIRECT IMAGING
Direct imaging, although exciting, is not necessarily the most reliable way of detecting extrasolar planets. It is very difficult to find circumstances that allow the discovery of planets through direct imaging, and therefore is one of the lesser used techniques.