Assignment 2: Paper Review

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Question

Read the exoplanet review paper provided. Download and read the four papers mentioned at the end of Philip's presentation.

Question: Which paper proposes a novel method that could be utilized to attract the attention of, and ultimately communicate with, extraterrestrial intelligence?

The four papers are:

- **Paper A:** *Transit Light-Curve Signatures of Artificial Objects*
- **Paper B:** *Searching for GEMS: Confirmation of TOI-5573 b, a Cool, Saturn-like Planet Orbiting an M Dwarf*
- **Paper C:** *Parallax Effect in Microlensing Events Due to Free-floating Planets*
- **Paper D:** *Earth as an Exoplanet: Investigating the Effects of Cloud Variability on the Direct-imaging of Atmospheres*

Answer

After reviewing the assigned papers, the one that proposes a novel method for attracting the attention of and potentially communicating with extraterrestrial intelligence is:

Paper A: *Transit Light-Curve Signatures of Artificial Objects* by Luc F. A. Arnold.

This paper explores the concept that artificially engineered planet-sized structures, intentionally created by an advanced civilisation, could produce distinctive transit light curves that differ from those of naturally occurring celestial bodies. The author explores various geometric configurations, such as triangular shapes, dual-screen constructs, and multi-screen louvre-like designs, and demonstrates that their transit signatures are detectably different from those of spherical or oblate planets.

Such artificially generated transit patterns could act as passive, large-scale signals intended to attract the attention of other civilisations. Given that upcoming space missions are expected to detect hundreds of transiting exoplanets, this method offers a promising and wide-reaching alternative to more active communication approaches like laser pulses. The concept is particularly notable for its potential sky coverage and observability using existing or soon-to-be-deployed observational infrastructure.