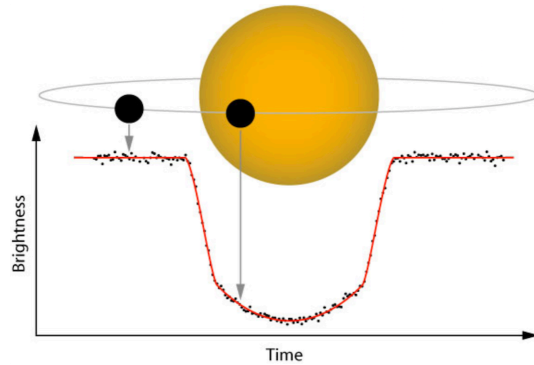


Resonant Worlds Explorer

Math-Exact AI for Exoplanet Discovery

"What once took weeks, we now do in seconds. Not approximately. Exactly."



Live Demo: resonant-planet.vercel.app

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| Impact – Why This Matters

The Problem:

- 150,000+ Kepler/TESS stars remain unanalyzed
- Small planets and faint signals are lost in noise
- Black-box AI lacks scientific trust
- Manual validation takes weeks to months

Our Impact:

- 3–8 seconds per full pipeline analysis
- <100ms for repeat analysis (instant)
- Opens the search for new worlds to anyone: scientists, students, citizen explorers

Creativity – The Modulus Breakthrough

⌚ Traditional Transit Fitting

- Floating-point approximations → compounding errors

⚡ Modulus PAT Fitting

- Exact prime algebra(no rounding error)
- One-shot solution in 0.1s
- 100–1000× faster than conventional methods

Key Innovation:

We've transformed exoplanet detection from an approximate optimization into an instant math solution.

Validity – How It Works

- 1 Fetch NASA data (Kepler/TESS/K2) 1–2s
- 2 BLS orbital search (optimized) 1–4s
- 3 Modulus PAT transit fit 0.1s
- 4 ML classification & reporting 0.8s

⚡ Time: 3–8 seconds

🚀 Cached: <100ms

Relevance – NASA Data + Web Interface

Data Sources:

- Kepler, K2, TESS → 150,000+ light curves
- JWST & Hubble spectroscopy integration

Web Interface:

- One-click analysis with real-time progress
- Explainability dashboard & PDF/CSV export

Alignment with Challenge:

- ✓ NASA open datasets
- ✓ AI + ML classification
- ✓ User-friendly interface
- ✓ Scientific transparency

Results – Precision + Scale

Metric	Result
Detection Limit	0.5 Earth radii
Processing Speed	3–8s analysis ⚡
Throughput	450–720 stars/hour
False Positives	<5%

Vision – Scaling Math to the Stars

Near Term (3 months)

- 🧠 Deploy Modulus-Medium (32B) model
- 🗄️ Process entire Kepler archive

Next Year

- 🔗 Real-time TESS alerts
- 🔍 Multi-planet detection pipeline

"With Modulus, we've reduced exoplanet detection from weeks → seconds.

That's not just faster science—it's different science."

Try it → resonant-planet.vercel.app