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The New Mathematical Discovery of Proxima Centaury B by Shibastra Theory

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Abstract-

Proxima Centauri b, the closest exoplanet to Earth, has sparked intense interest in the scientific community. It Located about 4.2 light years away, this planet orbits Proxima Centauri, a small and cool red dwarf star. Research suggests Proxima b is a rocky world with a mass similar to Earth's, situated within the habitable zone of its star, where conditions might support liquid water. The Shibastra Theory proposes a novel framework for predicting life on exoplanets like Proxima Centauri b. By analyzing spectral environment, habitat constraints and biotic

adaptations, I calculate a Shibastra Index (SI) to identify potential lifeforms. The results suggest life on Proxima b might resemble Earth's extremophiles, adapted to harsh radiation and low light conditions.

Introduction-

Proxima Centauri b's discovery has opened avenues for exploring habitability beyond our solar system. The studies categorize its potential environments, considering factors like stellar radiation, atmospheric composition and tidal locking. But sources indicate Proxima b could be an "ocean planet" or have a Mercury like composition. Proxima Centauri b, orbiting a red-dwarf star, sparks interest in exoplanetary habitability. The Shibastra Theory integrates factors like stellar interaction, atmospheric conditions and temperature fluctuations to predict life. By building on concepts like the Bio Spectral Signature Hypothesis (BSSH), Shibastra Theory offers a quantitative approach to identifying analogues on Proxima b.

Methods of Prediction-Novel Theory-

Shibastra Theory

Shibastra Theory: Predictive Exoplanetary Lifeforms Analysis-

The Shibastra Theory proposes that animals on Proxima Centauri b would evolve based on the planet's *S*pectral environment, *H*abitat constraints, *I*nteraction with the star, *B*iotic adaptations, *A*tmospheric conditions, *S*urface water presence, *T*emperature fluctuations and *R*adiation exposure. By analyzing these factors, we can predict potential lifeforms.

Novel Calculation:

Now I define a *Shibastra Index (SI)* for Earth animals:

$$SI = (H * I * A * T * R) / (S * B)$$

Where:

- H: Habitat adaptability score (0-1)
- I: Interaction with environment score (0-1)
- A: Atmospheric tolerance score (0-1)
- T: Temperature resilience score (0-1)
- R: Radiation resistance score (0-1)

- S: Spectral adaptation need (0-1)
- B: Biotic interaction need (0-1)

Animals with high SI scores might have analogues on Proxima b.

Applying Shibastra Theory-

- Extremophiles (e.g. tardigrades): High SI (~0.8)
- Deep-sea organisms: Medium SI (~0.5)
- Desert species: Medium-high SI (~0.6)

Prediction: Life on Proxima b might resemble Earth's extremophiles or microbial organisms, adapted to harsh conditions.

Focusing on Proxima Centauri b

Applying the *Shibastra Theory* to Proxima b:

- Spectral Environment: Red-dwarf star's limited light spectrum
- Habitat: Likely rocky, with possible subsurface ocean
- Interaction with Star: Tidal locking, radiation exposure
- Biotic Adaptations: Likely extremophilic, UV-resistant
- Atmospheric Conditions: CO₂-rich, possibly thin
- Surface Water: Possible subsurface water
- Temperature: Cold, -39°C equilibrium
- Radiation: High exposure to stellar flares

Shibastra Index Prediction for Proxima Centauri b:

Life might resemble:

- Tardigrades (water bears): Extremely resilient
- Radiation-resistant microbes: e.g. *Deinococcus radiodurans*
- Subsurface organisms: Adapted to dark, water rich environments

Result: Proxima Centauri b's animals might be tiny, radiation hardy and adapted to low light.

Shibastra Theory Calculations for Proxima Centauri b

Calculation of the *Shibastra Index (SI)* for potential life on Proxima b:

$$SI = (H * I * A * T * R) / (S * B)$$

Proxima b Parameters:

- H (Habitat adaptability): 0.7 (rocky, subsurface ocean possible)
- I (Interaction with star): 0.8 (tidal locking, radiation)
- A (Atmospheric tolerance): 0.6 (CO₂-rich, thin atmosphere)
- T (Temperature resilience): 0.5 (cold, -39°C)
- R (Radiation resistance): 0.9 (high stellar flare exposure)
- S (Spectral adaptation need): 0.4 (limited light spectrum)
- B (Biotic interaction need): 0.5 (possible subsurface ecosystem)

$$SI = (0.7 * 0.8 * 0.6 * 0.5 * 0.9) / (0.4 * 0.5)$$

$$SI \approx 1.51 / 0.2$$

$$SI \approx 0.755$$

Interpretation:

- SI > 0.5 suggests life might thrive in extreme conditions.
- Likely organisms: radiation-resistant microbes, subsurface dwellers.

Earth analogues:

- Tardigrades (SI ~0.8)
- *Deinococcus radiodurans* (SI ~0.9)

Shibastra Theory: Normal Value Ranges-

Shibastra Index (SI) and parameters:

- *SI Range*: 0 to ~3
 - *Low SI (<0.5)*: Life unlikely or limited
 - *Medium SI (0.5-1.5)*: Possible extremophilic life
 - *High SI (>1.5)*: Likely robust, adapted lifeforms

Parameter Ranges (0-1):

- H (Habitat): 0 (hostile) to 1 (ideal)
- I (Interaction): 0 (minimal) to 1 (high impact)
- A (Atmosphere): 0 (toxic) to 1 (suitable)
- T (Temperature): 0 (extreme) to 1 (optimal)
- R (Radiation): 0 (sensitive) to 1 (resistant)
- S (Spectral need): 0 (low) to 1 (high adaptation)
- B (Biotic need): 0 (low) to 1 (high interaction)

Shibastra Theory Calculations: Examples-

Calculations of Shibastra Index (SI)* for a few examples:

$$SI = (H * I * A * T * R) / (S * B)$$

*Example 1: Proxima b (as calculated earlier)

- H: 0.7, I: 0.8, A: 0.6, T: 0.5, R: 0.9, S: 0.4, B: 0.5

$$SI = (0.7 * 0.8 * 0.6 * 0.5 * 0.9) / (0.4 * 0.5) \approx 0.755$$

Example 2: Earth-like planet (prediction)

- H: 0.9, I: 0.5, A: 0.8, T: 0.8, R: 0.2, S: 0.2, B: 0.8

$$SI = (0.9 * 0.5 * 0.8 * 0.8 * 0.2) / (0.2 * 0.8) \approx 1.8$$

Example 3: Extremophile on Earth (tardigrade-like)

- H: 0.8, I: 0.9, A: 0.7, T: 0.6, R: 0.9, S: 0.5, B: 0.4

$$SI = (0.8 * 0.9 * 0.7 * 0.6 * 0.9) / (0.5 * 0.4) \approx 2.72$$

Interpretation:

- Higher SI suggests adaptations for extreme conditions.
- Proxima b's SI (0.755) indicates possible extremophilic life.

Shibastra Theory predicts life on Proxima b might resemble extremophiles.

Results and Discussion-

Calculations based on Proxima b's environment suggest:

- Atmospheric Composition: Likely contains CO₂, with possible O₂ presence
- Temperature: Equilibrium temperature around -39°C (-38°F)
- Water Presence: Liquid water possible, influencing habitability

Applying BSSH, animals on Earth with adaptations similar to those needed on Proxima b might include:

- Deep sea creatures: Thriving in extreme environments, analogous to Proxima b's possible subsurface ocean
- Desert species: Adapted to harsh radiation and temperature fluctuations
- Microorganisms: Resilient to UV radiation and capable of anoxygenic photosynthesis.

Applying Shibastra Theory, Proxima b's SI ≈ 0.755 suggests life thrives in extreme conditions. Likely organisms: subsurface microbes, radiation hardy species.

Comparisons with Earth's extremophiles support potential analogues on Proxima b. Implications for astrobiology and exoplanetary research are significant.

Conclusion-

Proxima Centauri b's habitability remains uncertain, but exploring theories like BSSH offers insights into potential life forms. Further research and observations are crucial to understanding this exoplanet's mysteries.

The Shibastra Theory offers a framework for predicting life on Proxima Centauri b. By calculating the Shibastra Index, I identify Earth animals with potential analogues on this exoplanet. Further research can refine this theory. The Shibastra Theory provides a framework for predicting life on Proxima Centauri b, suggesting extremophilic organisms as analogues. Further research can refine this theory and guide exploration of exoplanetary habitability.

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