

The background is a gradient from deep red at the top to dark blue at the bottom, speckled with white stars. Overlaid on this are several faint, white geometric and celestial diagrams. On the left, a large circular scale with degree markings from 140 to 260 is visible. To its right, there are several concentric circles and arcs, some with arrows indicating a path or direction. These elements suggest a theme of astronomy or celestial mechanics.

INFLUENCE OF STELLAR COMPANIONS ON FOMALHAUT'S RING

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VOCABULARY

- Binary Star
 - Second Star in a System
- Tertiary Star
 - Third Star in a System
- Astronomical Unit (AU)
 - 150 million km
- Galactic Tide
- Eccentricity
 - 0 to 1



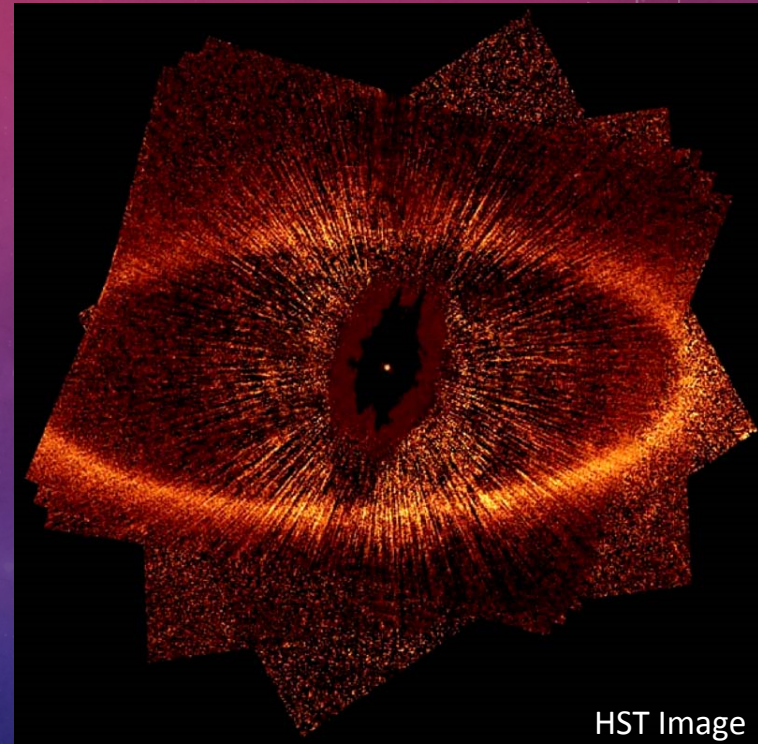
FOMALHAUT SYSTEM

- Fomalhaut A
 - 25 ly from Earth
 - 1.92 Solar Masses
 - Ring of Dust
- Fomalhaut B
 - 50,000 AU
 - 0.72 Solar Masses
- Fomalhaut C
 - 150,000 AU
 - 0.18 Solar Masses



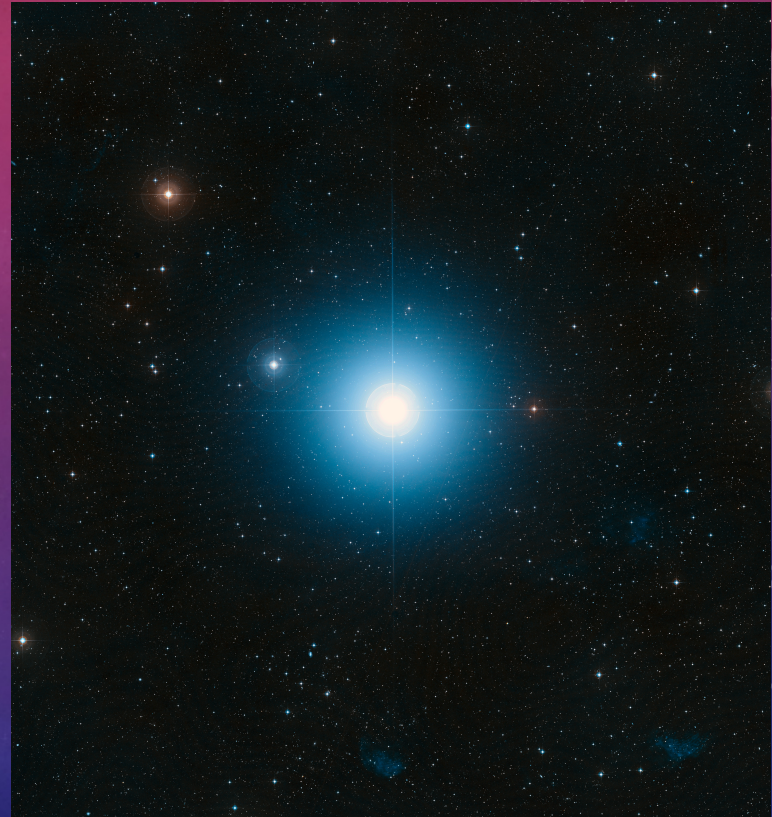
FOMALHAUT'S RING

- Why are we interested in Fomalhaut's ring?
 - Eccentricity of 0.1
- Planetary Detection
 - Observe Eccentricity
 - Evidence for Planet



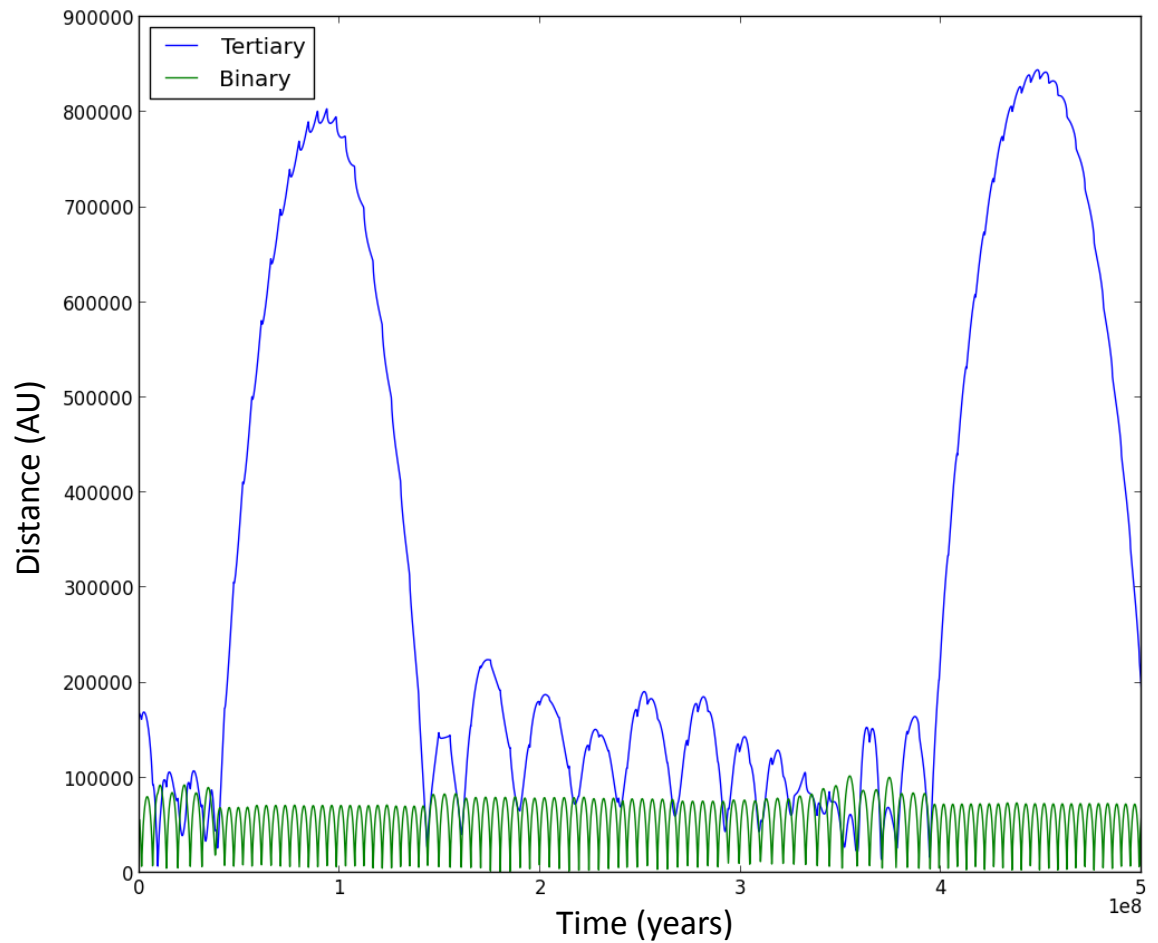
STELLAR EVOLUTION

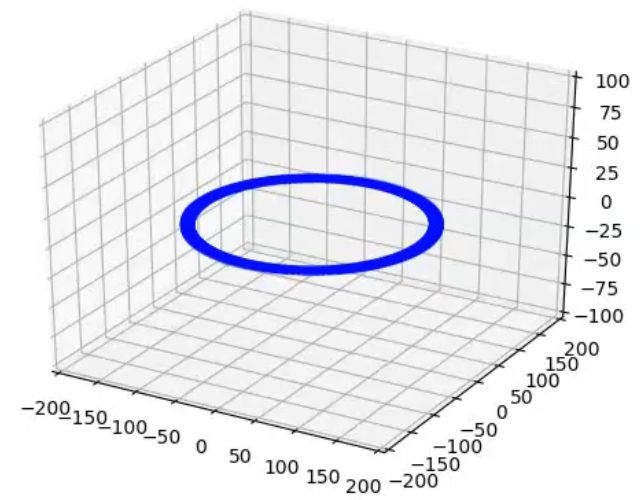
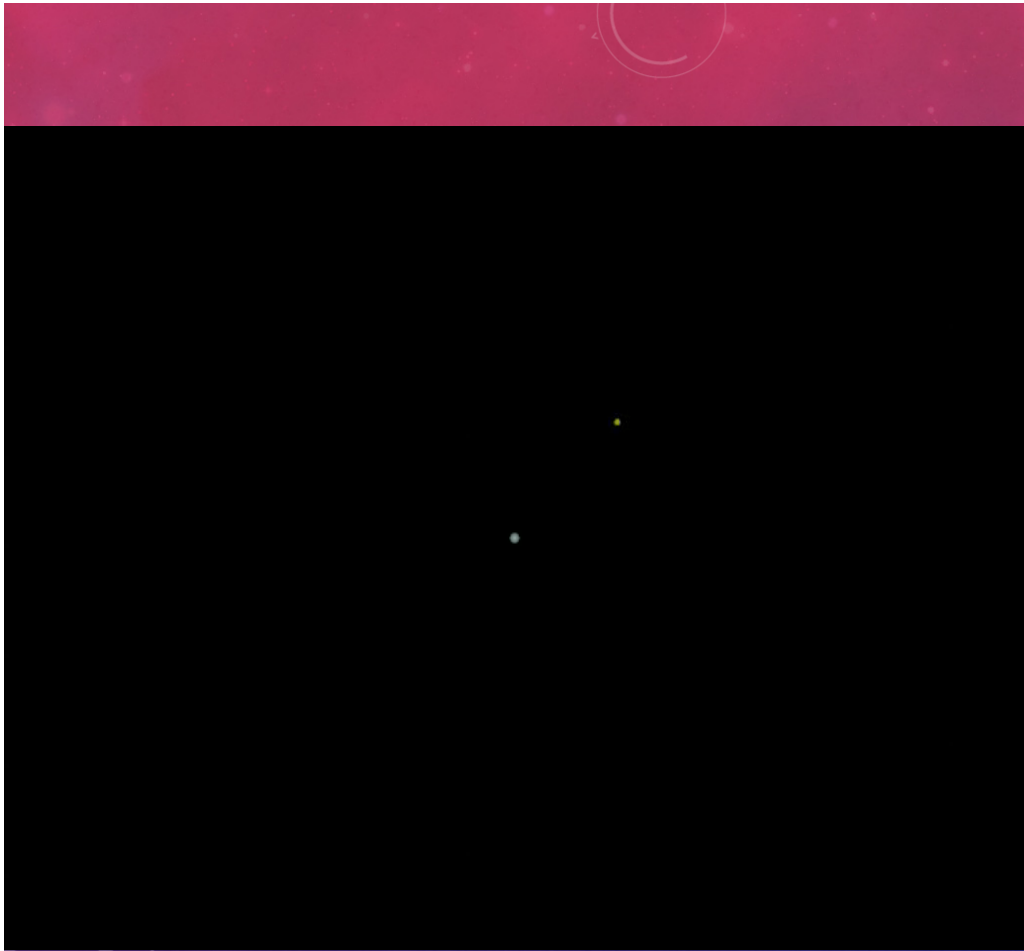
- Companion Stars
 - Long Orbital Periods
 - Tens of Millions of Years
 - Unstable Orbits
 - Galactic Tide
 - Stellar Passages

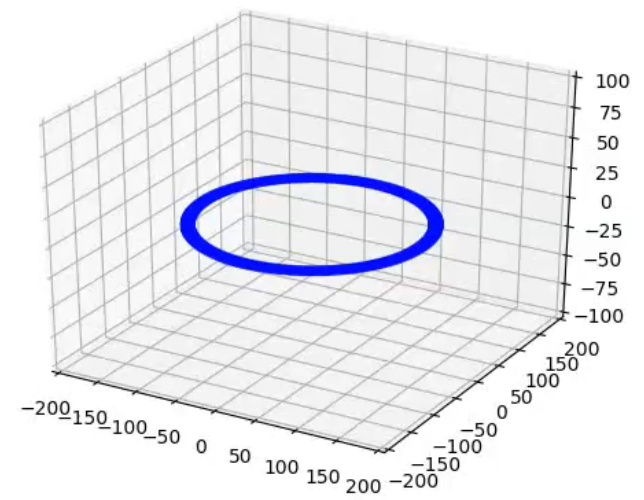
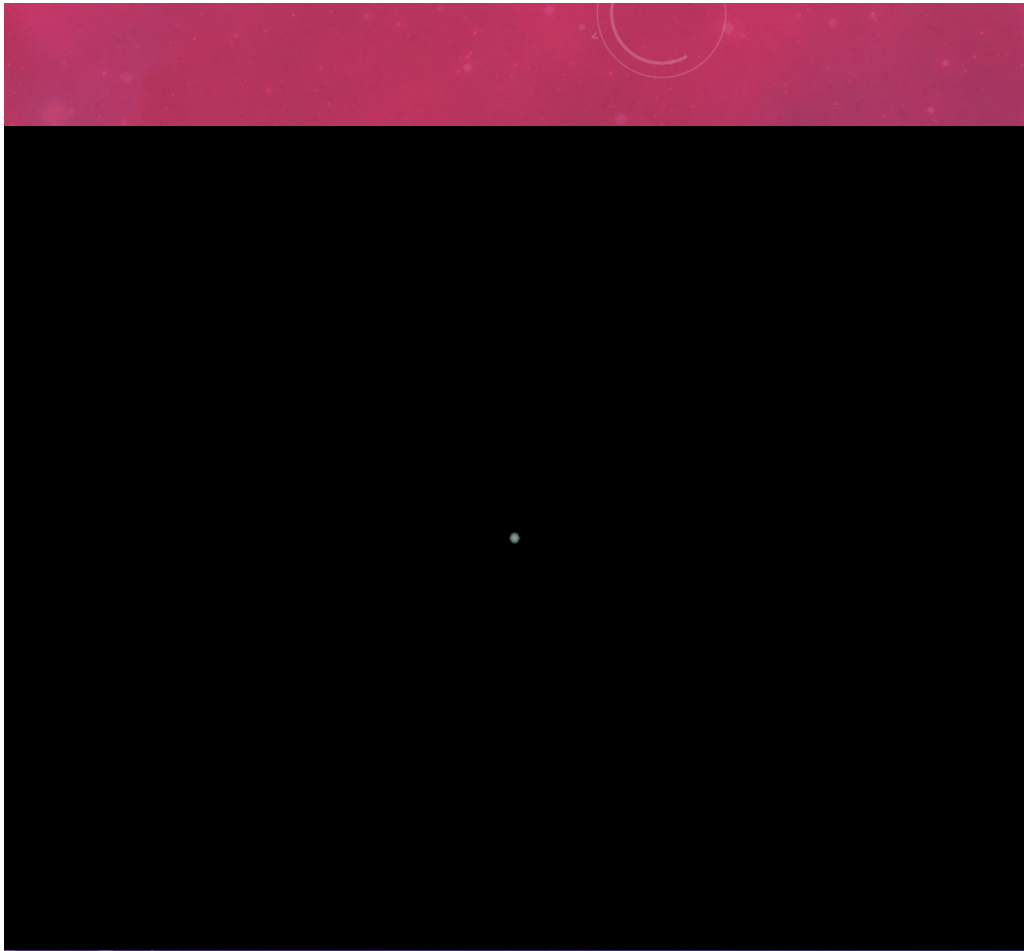


SIMULATIONS

- 2000 Simulations
 - Random Initial Conditions
 - No Disk
- Final Positions
 - Simulations within 50% of Observed
 - Rerun with Disk







WHAT IS A SUCCESS

- Median Eccentricity
 - Greater than 0.05
 - Less than 0.2
- Spread of Orbits
 - Low Standard Deviation
 - Well Defined Ring

RESULTS

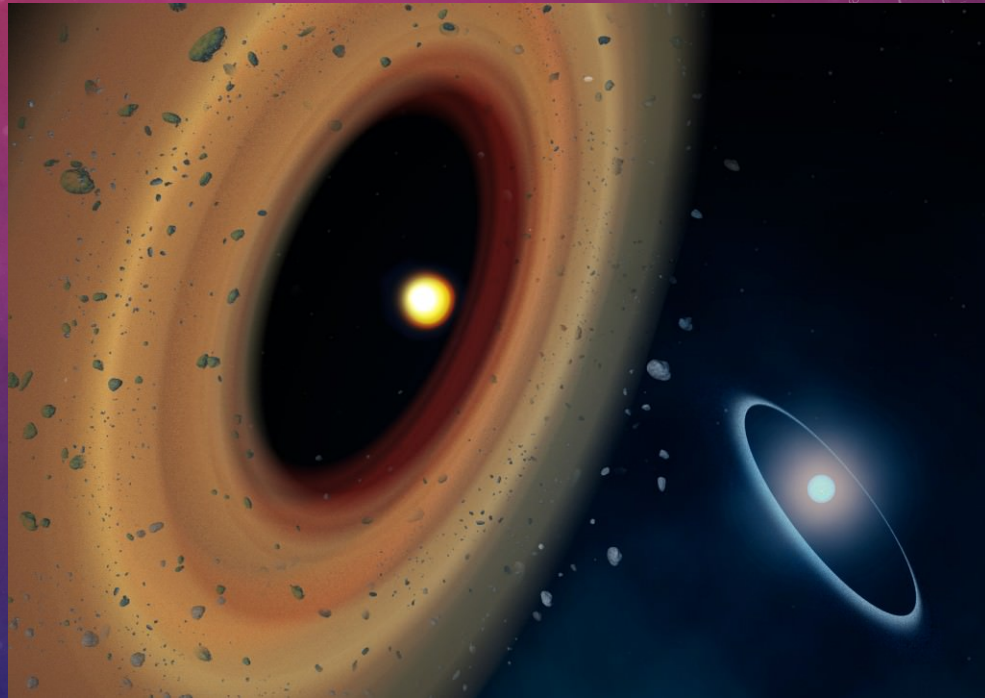
- 2000 Simulations
- 135 with Correct Final Positions
- 7 Interesting Simulations

CONCLUSION

- Many Simulations
 - About 1% Finished with Correct Final Conditions
- Eccentric Ring Recreated with Stellar Companions
- Eccentric Ring not Necessarily a 'Smoking Gun' for Planetary Detection
- Upcoming Observations
 - James Webb Space Telescope

FUTURE WORK

- Fomalhaut C
 - Ring of dust
 - 10 to 40 AU
- Alter Simulations
 - Same Initial Conditions
 - Add Ring around Fomalhaut C





Questions?