

# Answering the Oldest Question in Exoplanets

## The Origin of Hot Jupiters

Jacob Hamer

Johns Hopkins University

Email: [jhamer3@jhu.edu](mailto:jhamer3@jhu.edu)

Website: [jacobhhamer.github.io](http://jacobhhamer.github.io)

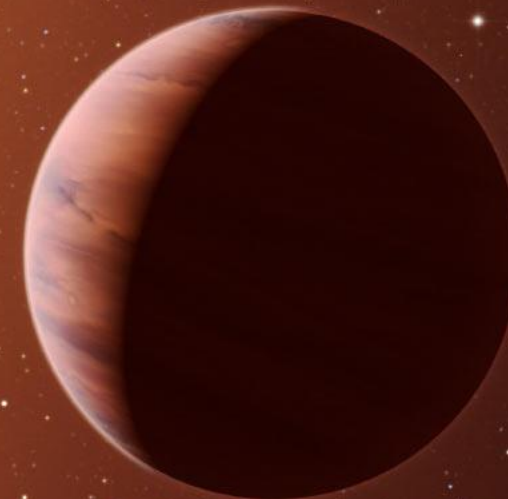
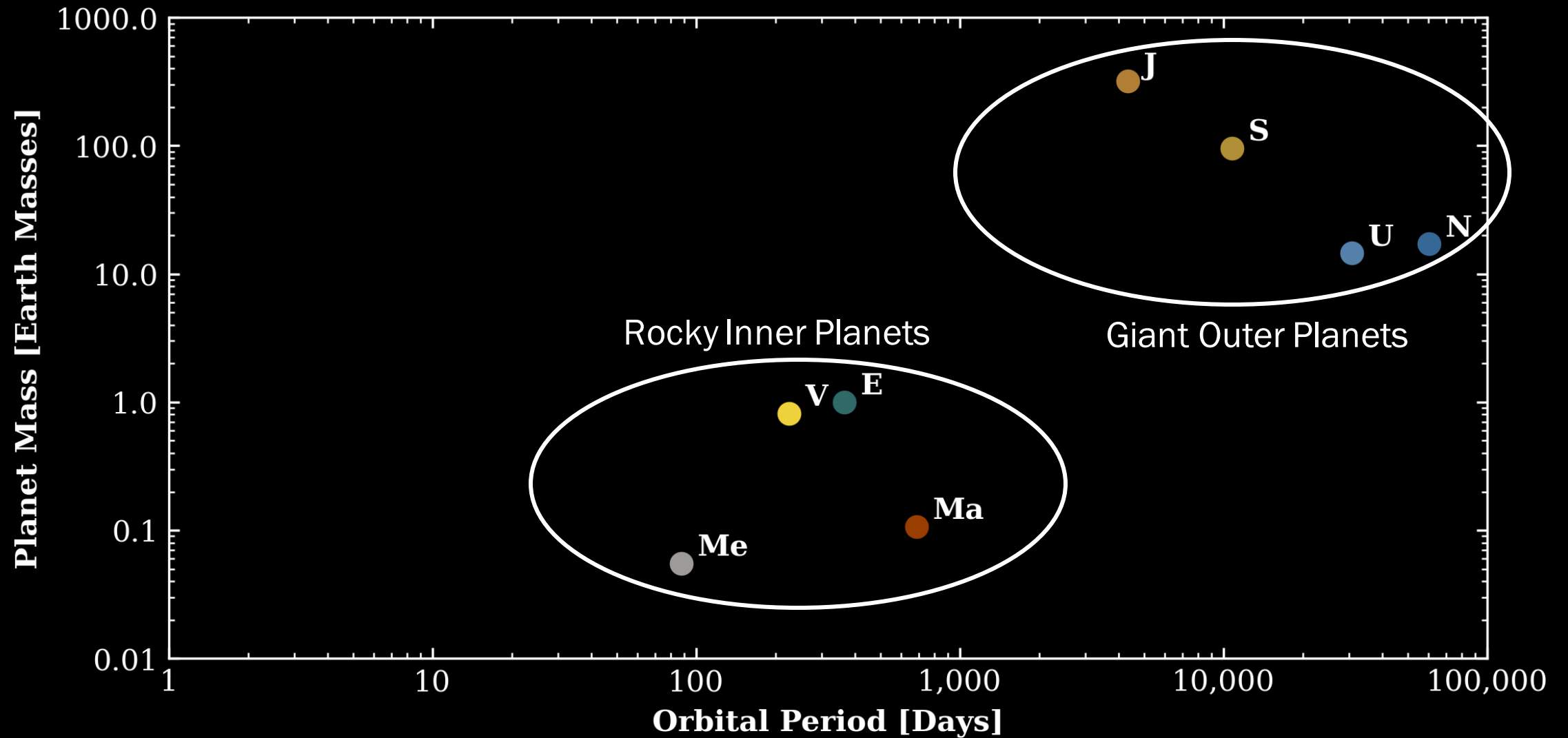
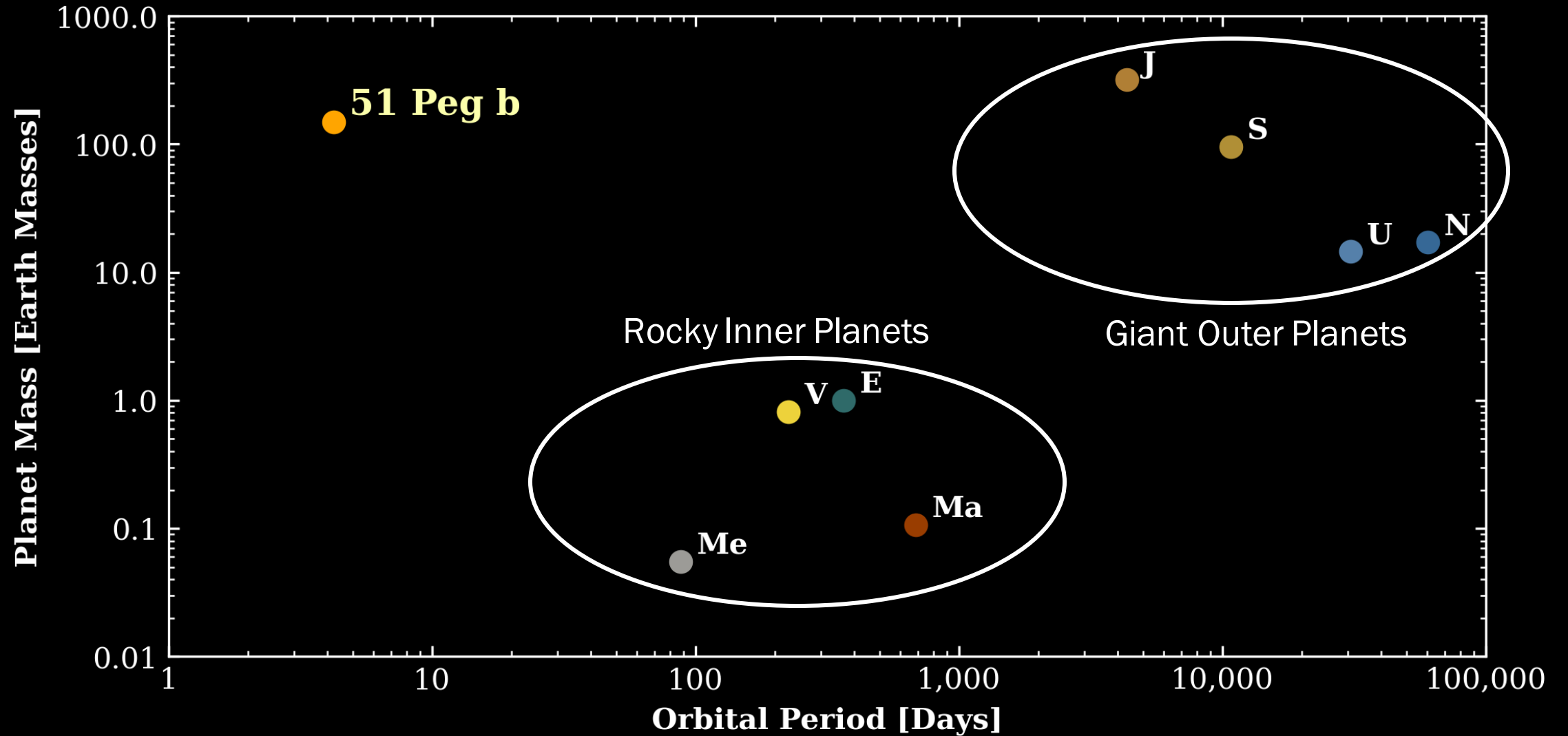


Image credit: L. Calçada / ESO.

# The Solar System



# October 6, 1995: The First Exoplanet Around a Sun-Like Star



# Clues About Hot Jupiter Formation?

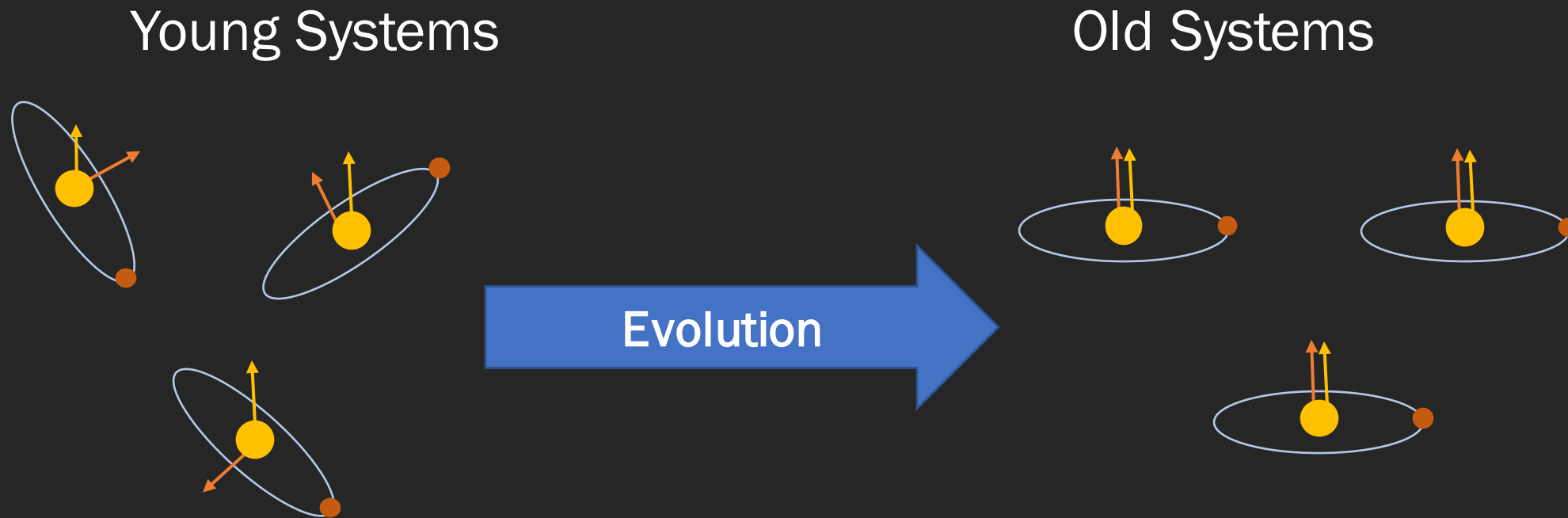
Aligned  
Hot Jupiter



Misaligned  
Hot Jupiter

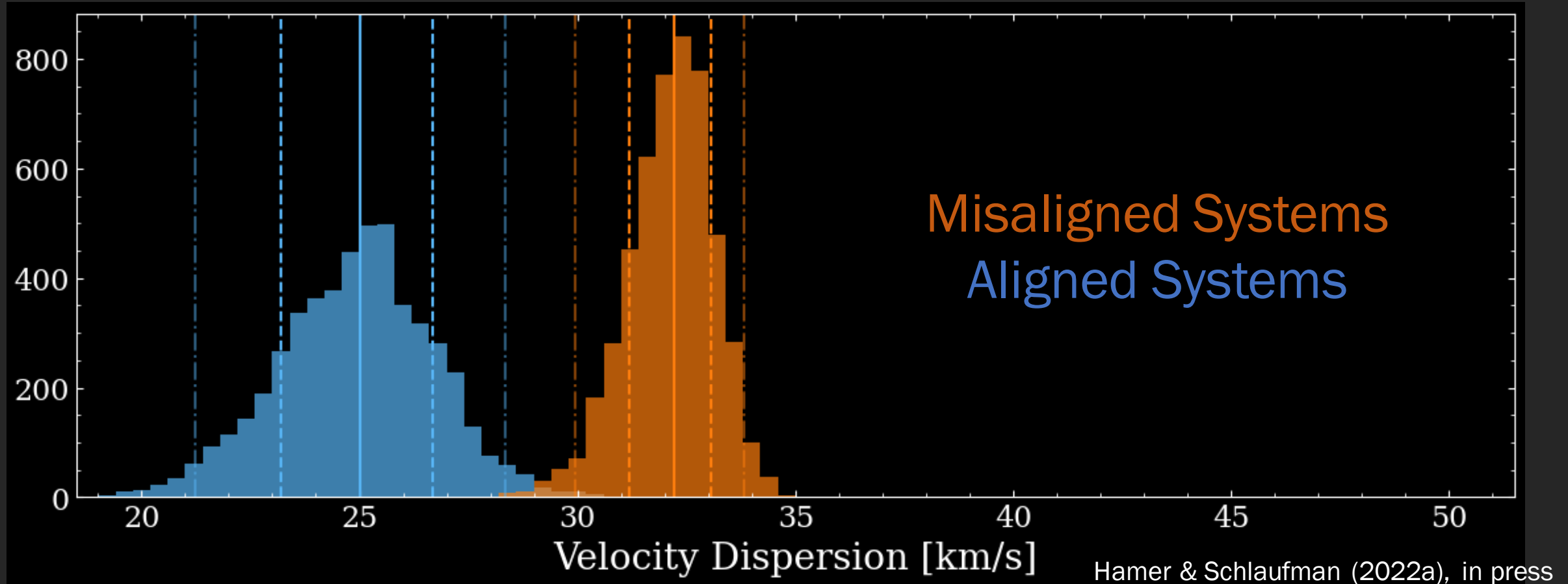


# Are Alignments a Product of Formation or Evolution?



**If hot Jupiters form misaligned and get realigned over time,  
then aligned systems should be older than misaligned systems**

# Misaligned Hot Jupiters Are Older than Aligned Hot Jupiters

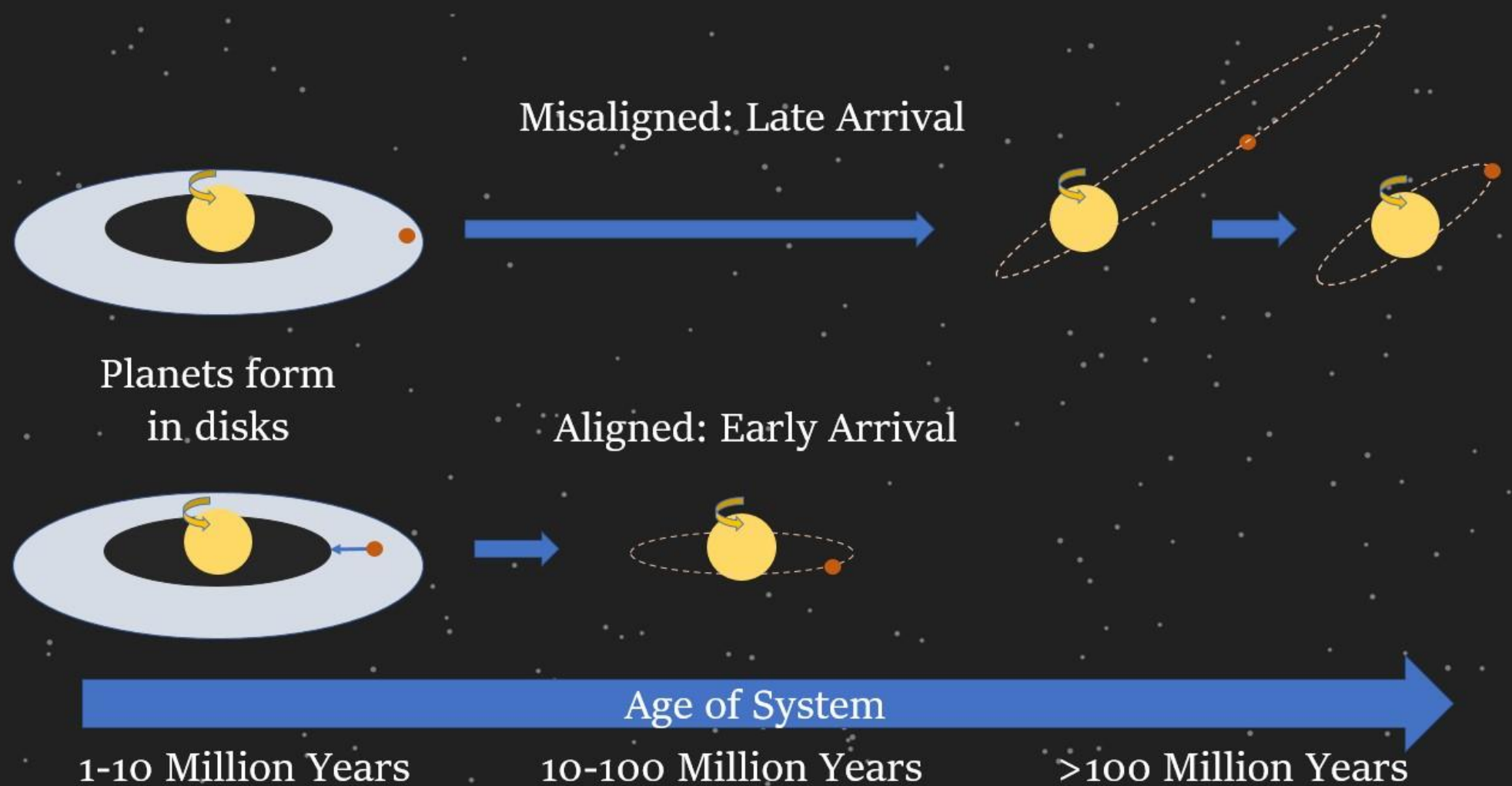


Stars Move Similarly, Younger

← Younger

Stars Move Differently, Older

# Misaligned Hot Jupiters Arrive Late, Aligned Hot Jupiters Arrive Early



# Conclusions and Contact Info

## Conclusions

1. Hot Jupiters form in multiple ways, with aligned systems forming quickly, and misaligned systems forming later
2. Some misaligned systems become realigned over time
3. In 2019, I used the same method to show hot Jupiters inspiral into their host stars and are destroyed

## Contact Information

- Email: [jhamer3@jhu.edu](mailto:jhamer3@jhu.edu)
- Website: [jacobhhamer.github.io](https://jacobhhamer.github.io)