

# Angular Momentum Of Stars During Formation: Effect of Accretion on Stellar Spin

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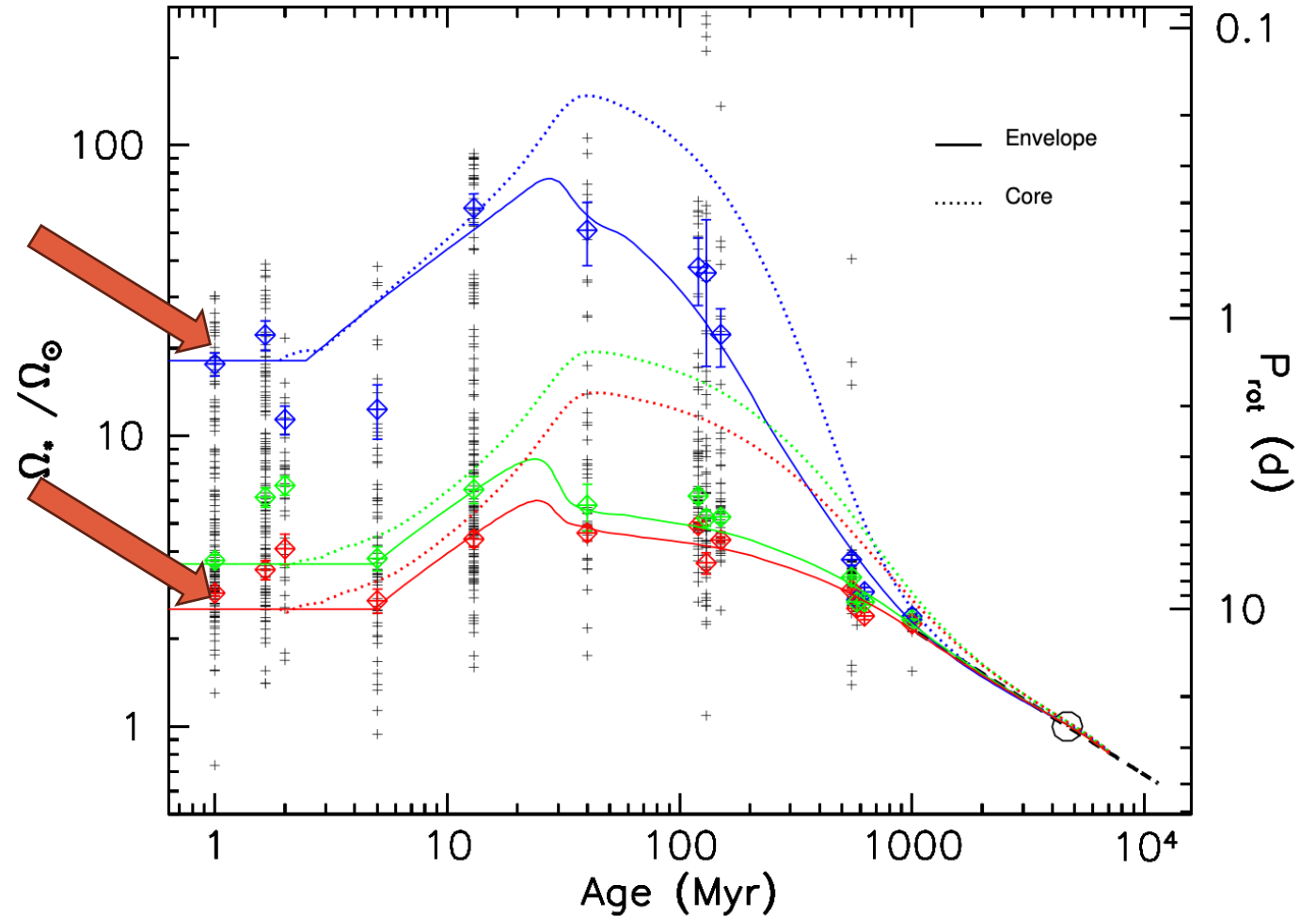
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# Angular Momentum evolution

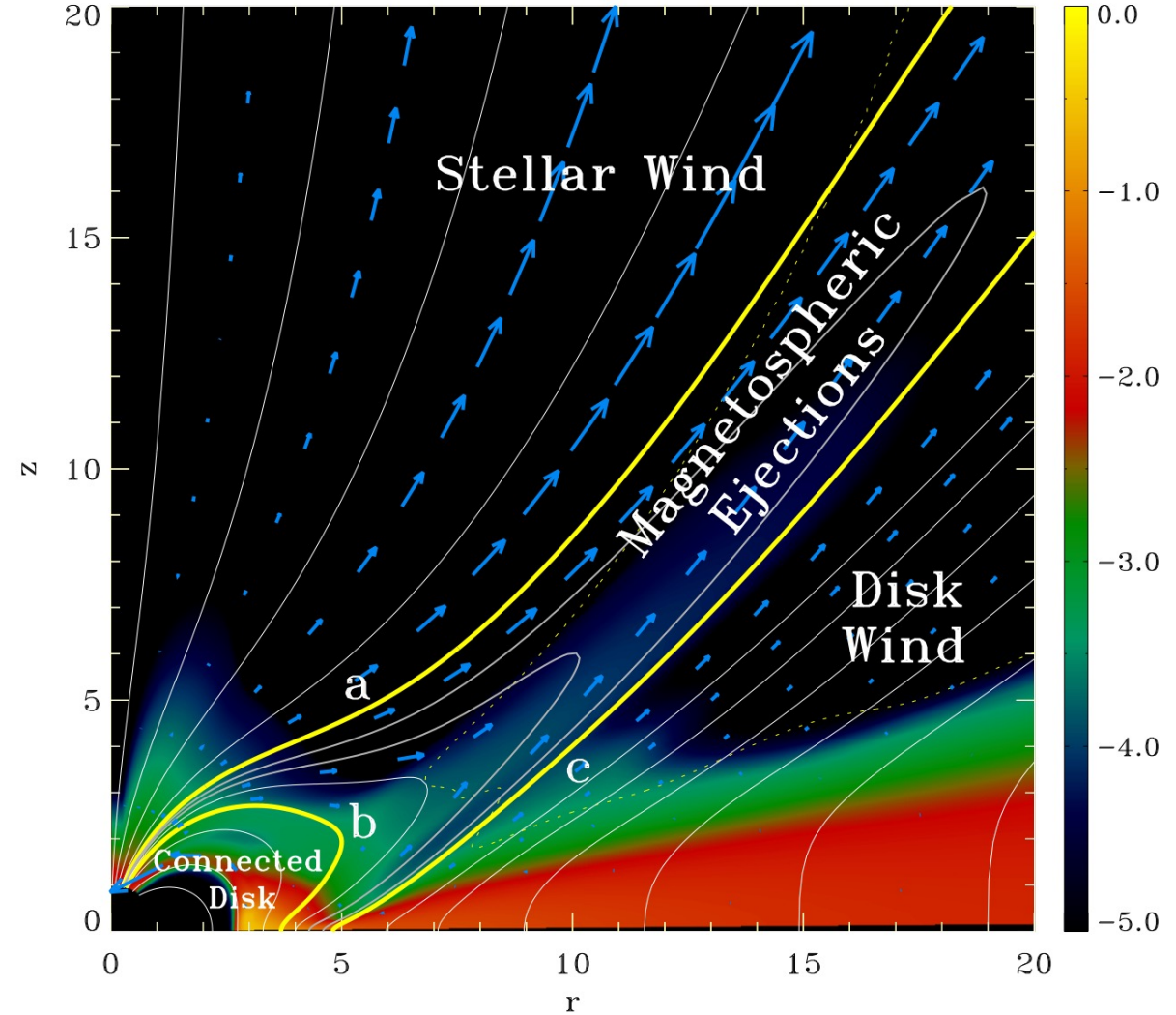
- Figure shows the rotation rate and angular velocity of solar-type stars
- Blue are fast rotators, green median, and red is slow
- My project will focus on the accretion phase
  - Disk-locking



Gallet & Bouvier, 2013

# Star-disk Interactions

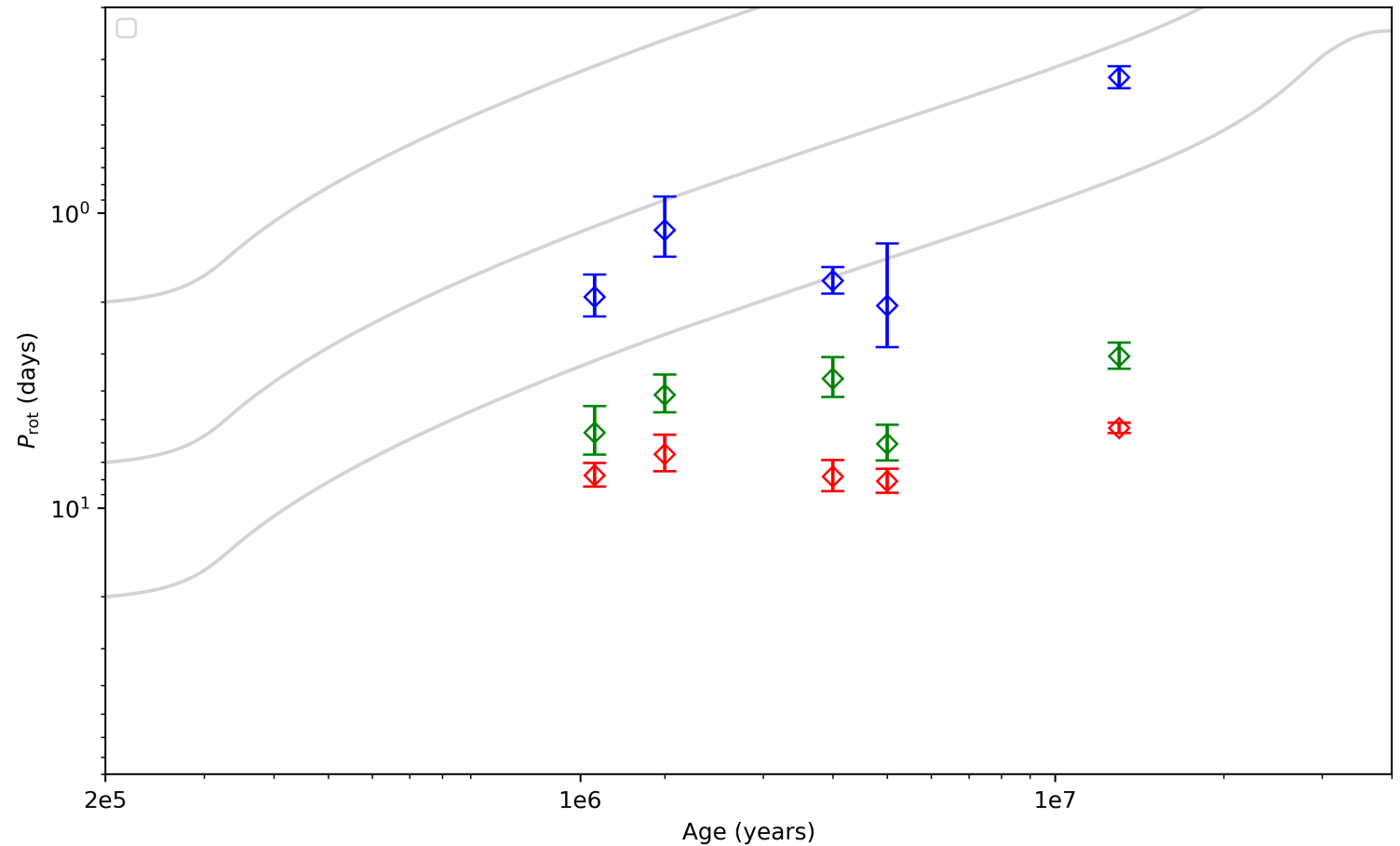
- Accretion
  - Accretion Phase
  - Accretion Disk
- Figure shows a star-disk interacting system
- Different environmental factors that can affect the angular momentum



Zanni & Ferreira, 2013

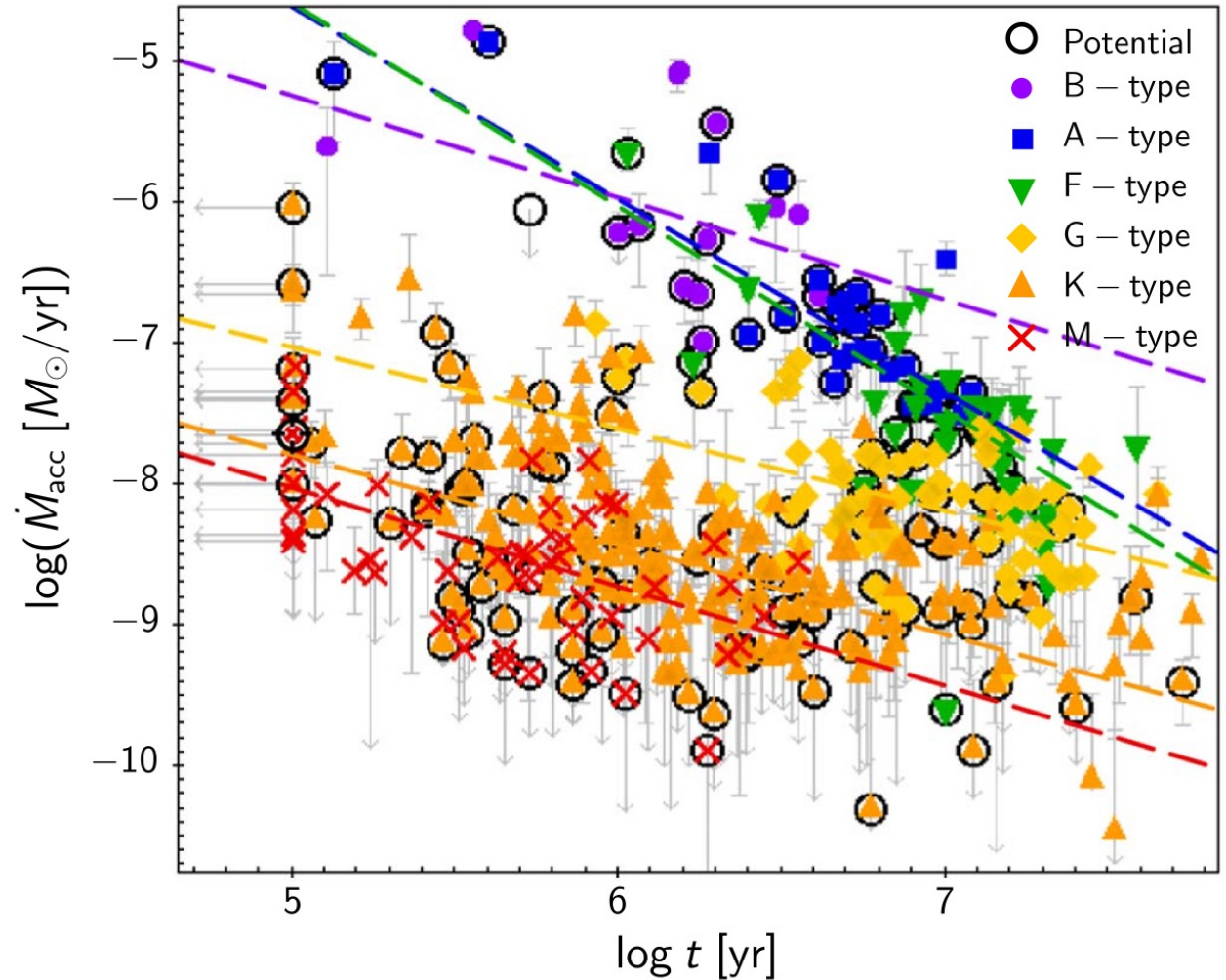
# Models of the rotational evolution

- DizzyStars
- Parameters:
  - Accretion History
  - Initial Mass Accretion Rate
  - Disk Lifetime
  - Magnetic Field Strength
- Figure shows the rotation of star as a function of time
- Observational data is from Gallet & Bouvier 2015



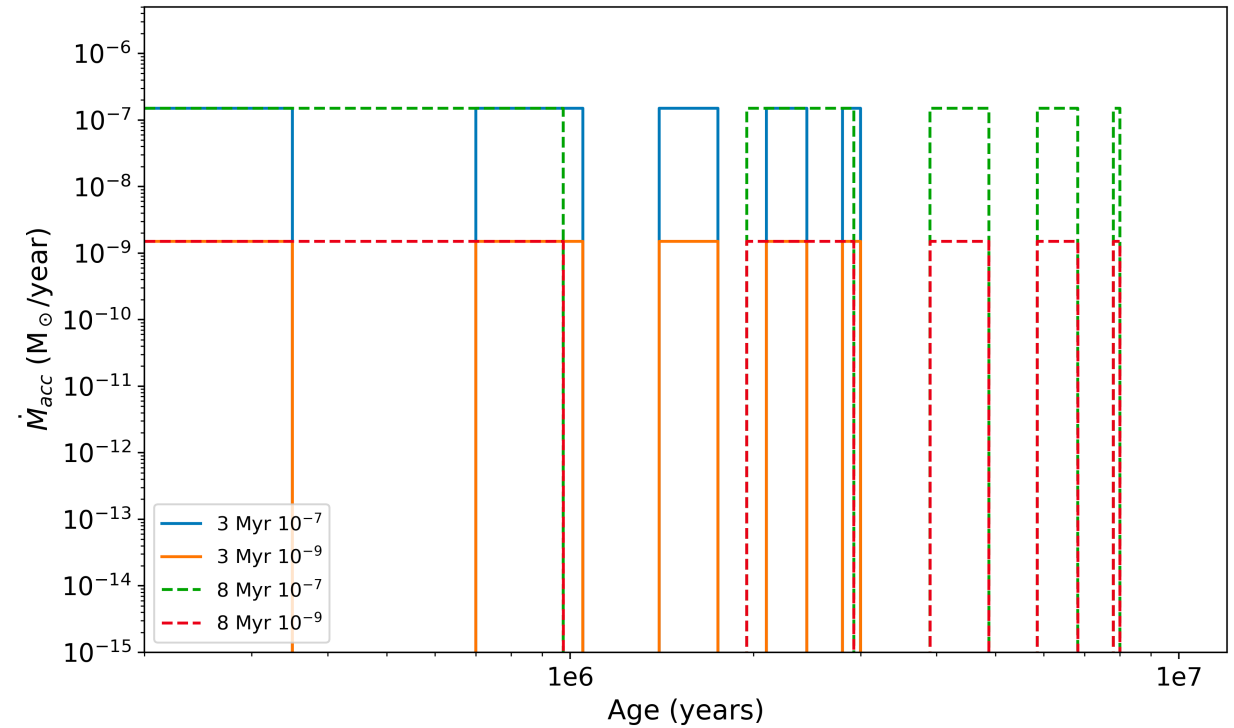
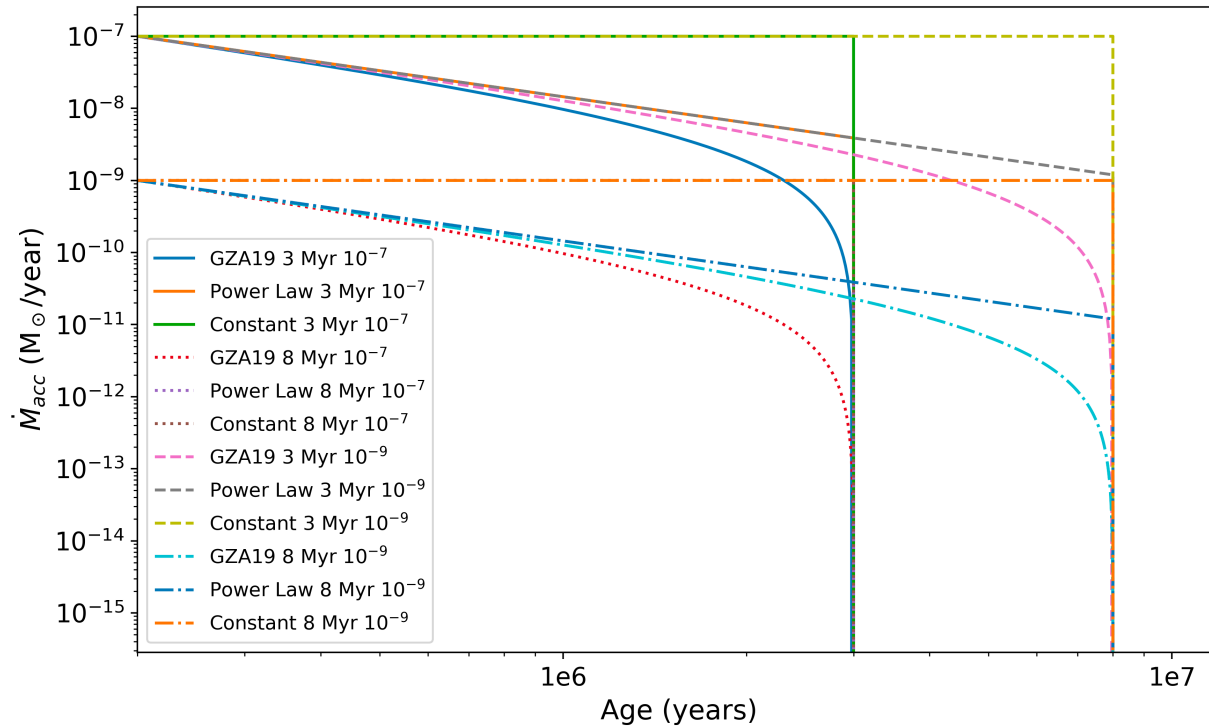
# Observational Findings

- Models used solar type stars for my project
- Figure shows the mass accretion rate as a function of time
  - Expect a power law function based on observational data

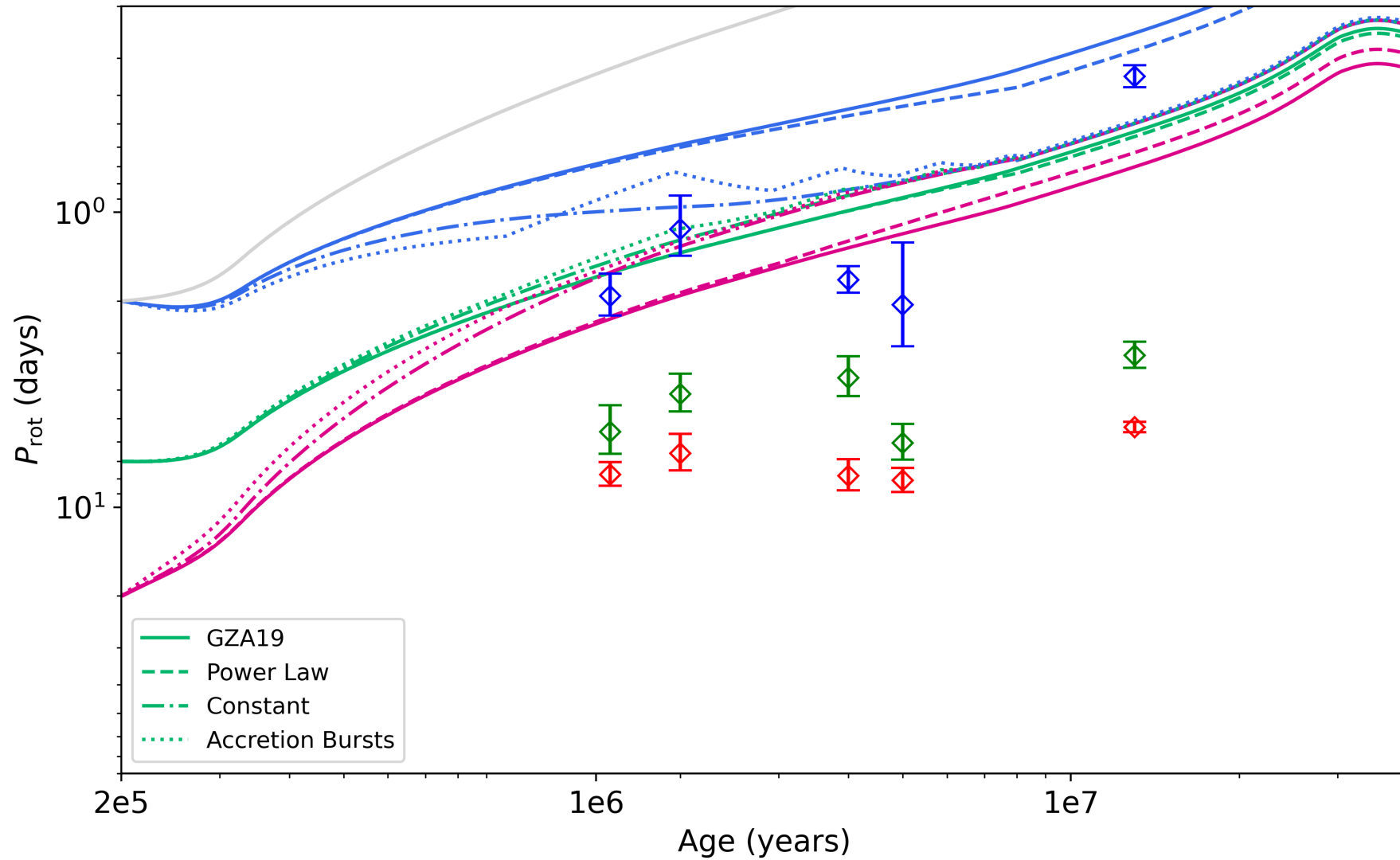


Venuti et al, 2024

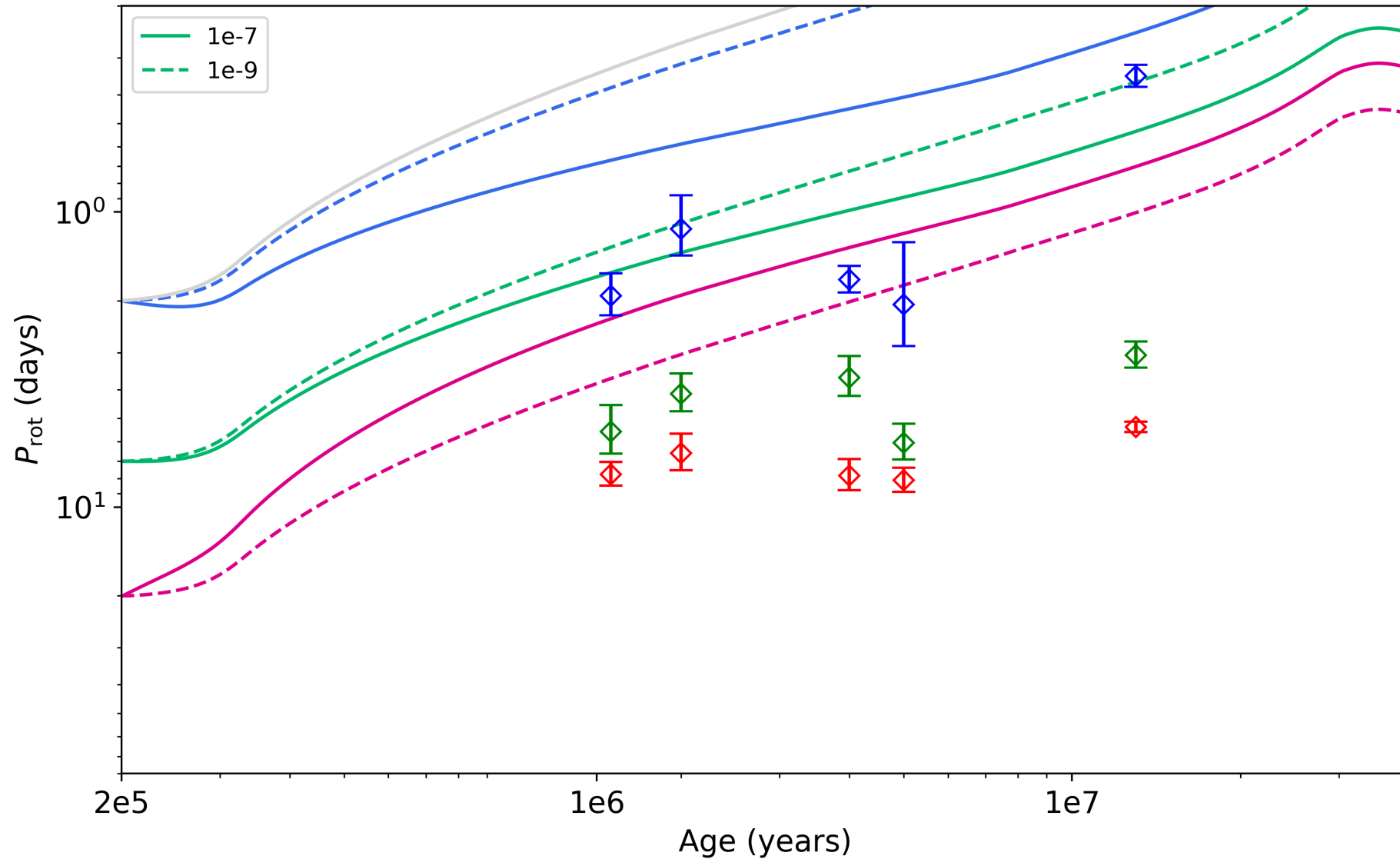
# Accretion Histories



# Accretion Histories

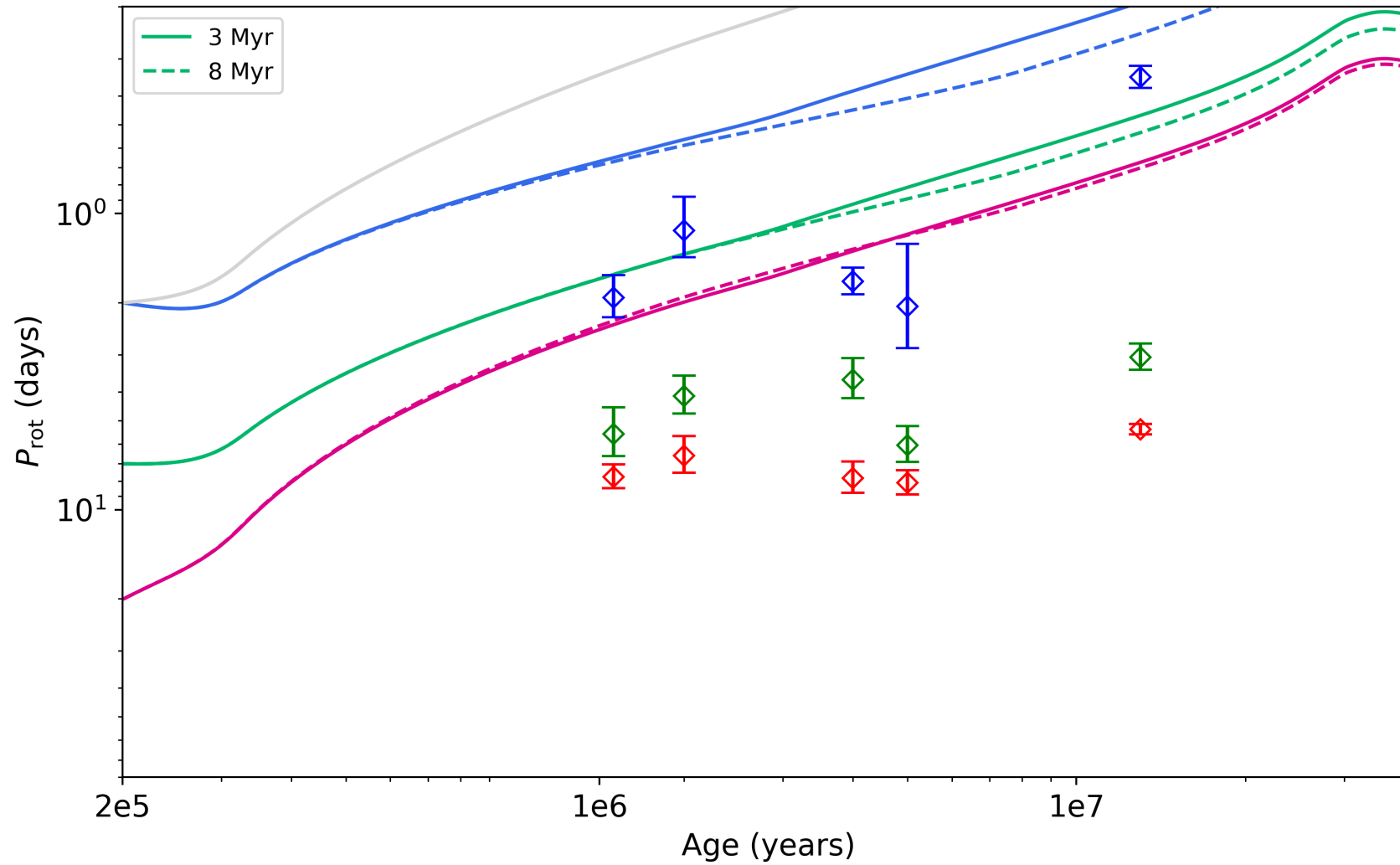


# Initial Mass Accretion Rate





# Disk Lifetime

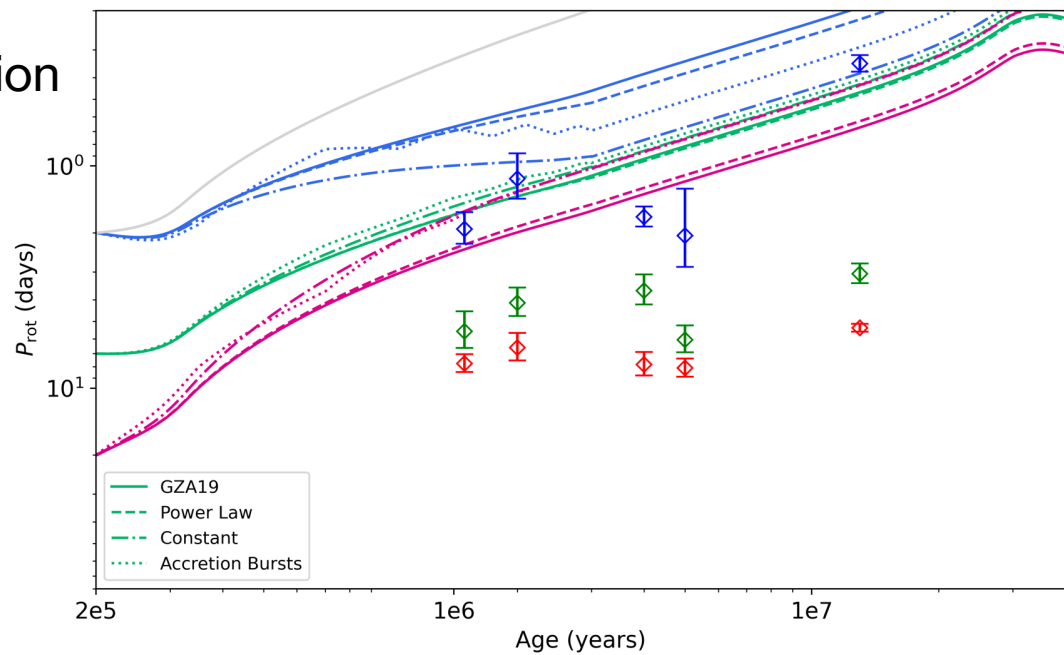




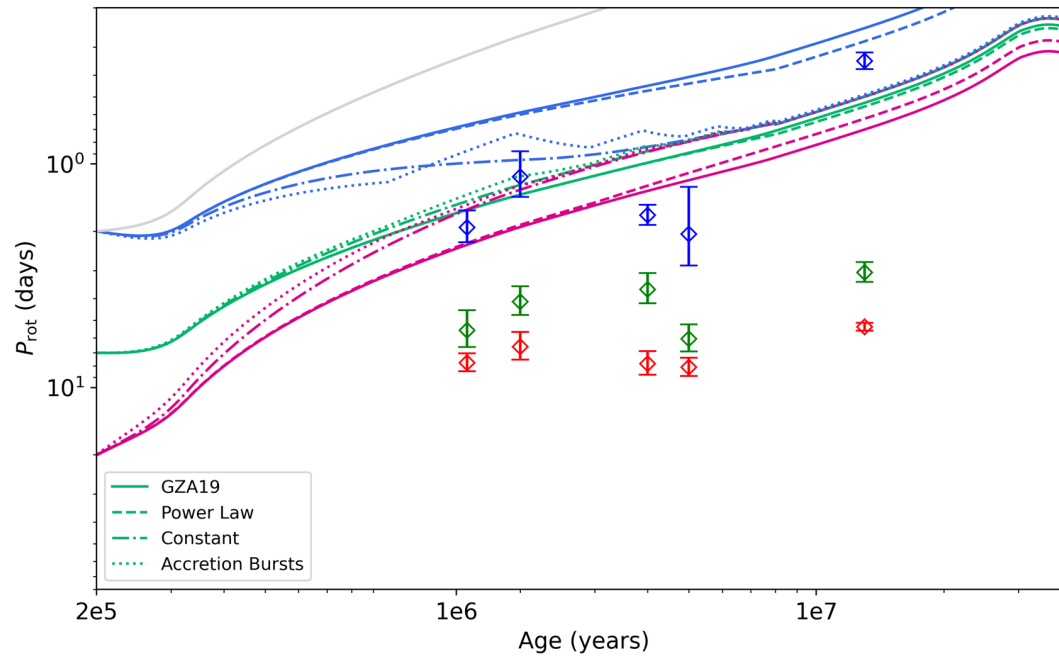
Initial  
Mass  
Accretion  
=

$10^{-7}$   
 $M_{\odot}/\text{Year}$

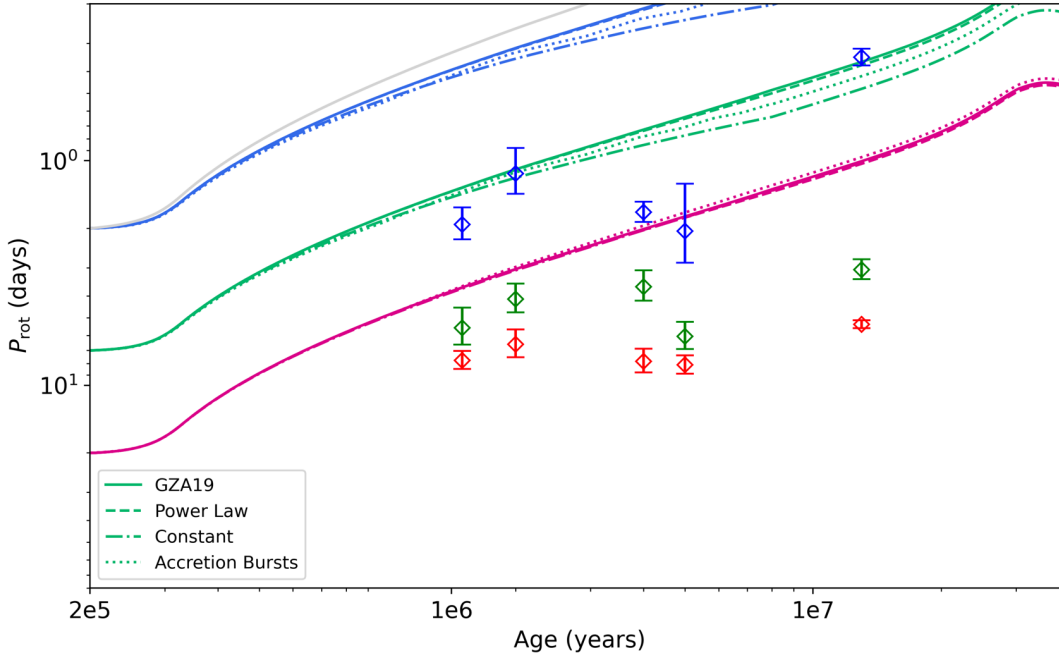
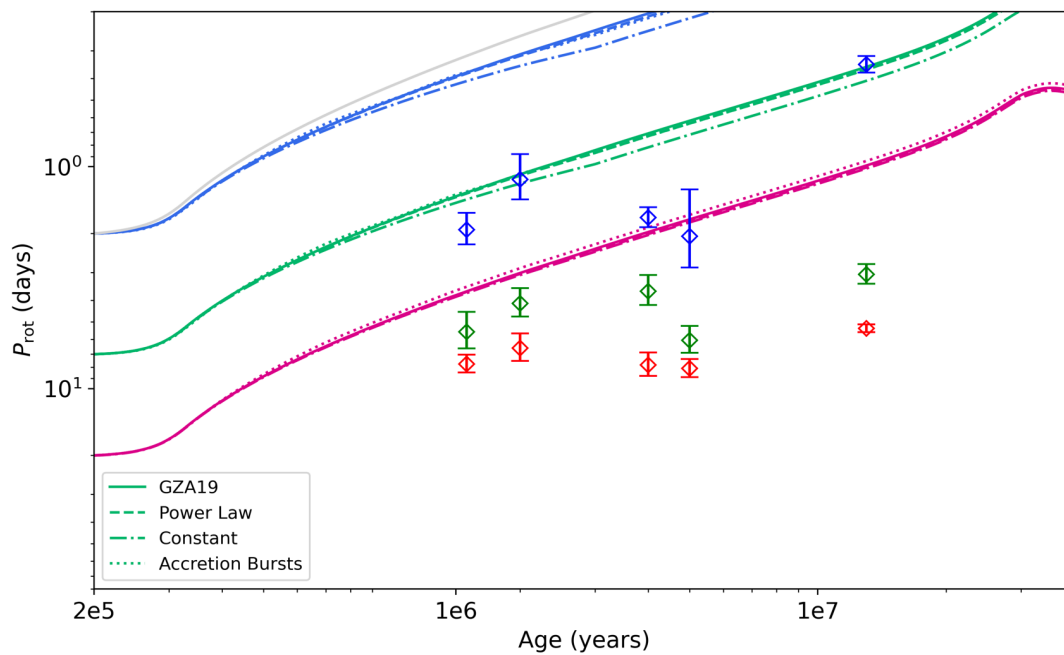
Disk Lifetime = 3 Myr



8 Myr

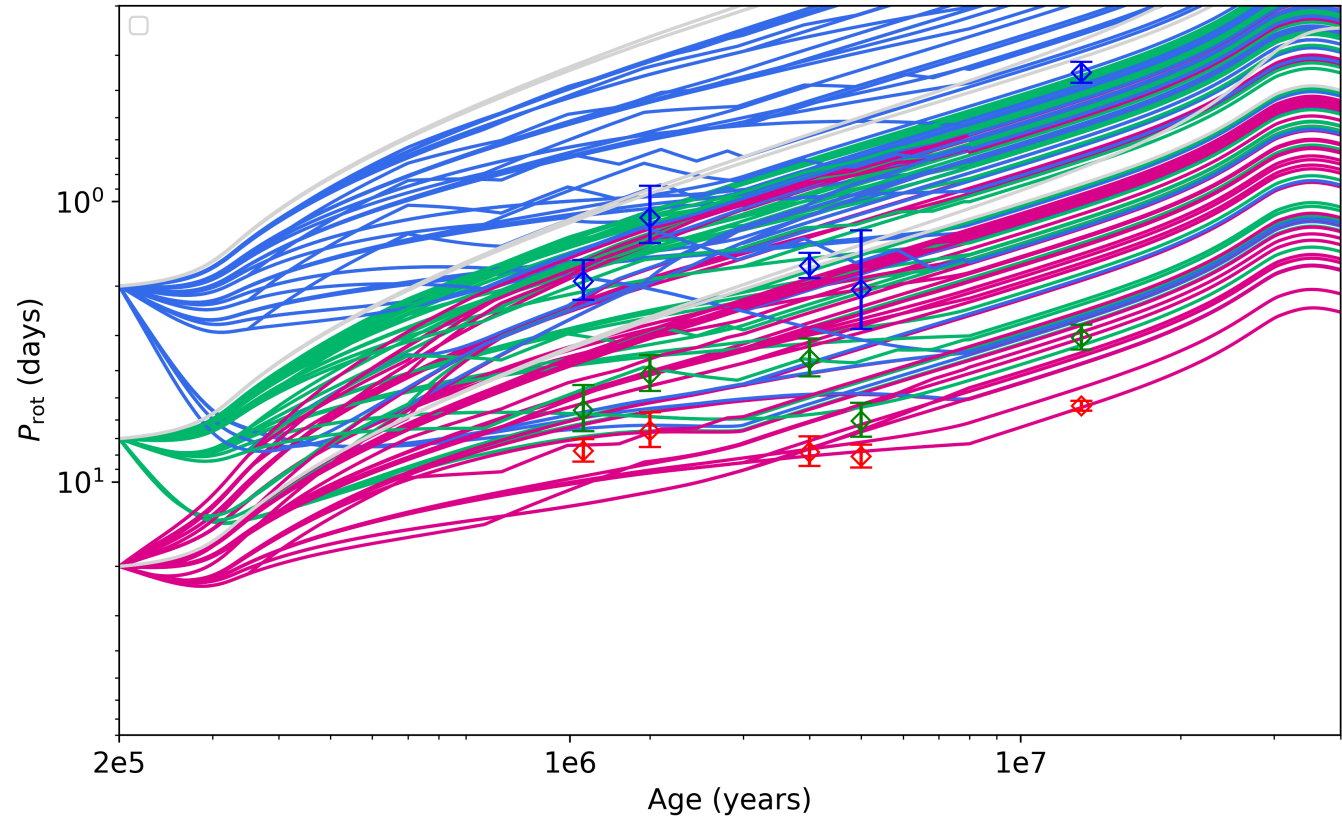


$10^{-9}$   
 $M_{\odot}/\text{Year}$



# Conclusions

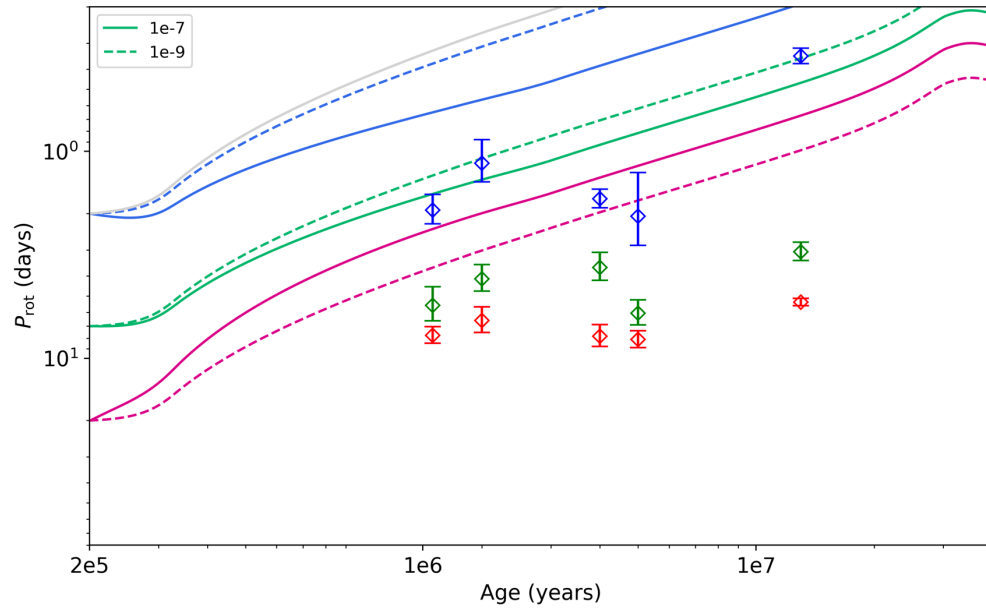
- Accretion does affect the rotation
- Magnetic Field strength has a very strong impact
  - Observations show that a higher magnetic field strength is unlikely
- Future Parameters to explore
  - Stellar wind
  - Additional Accretion histories



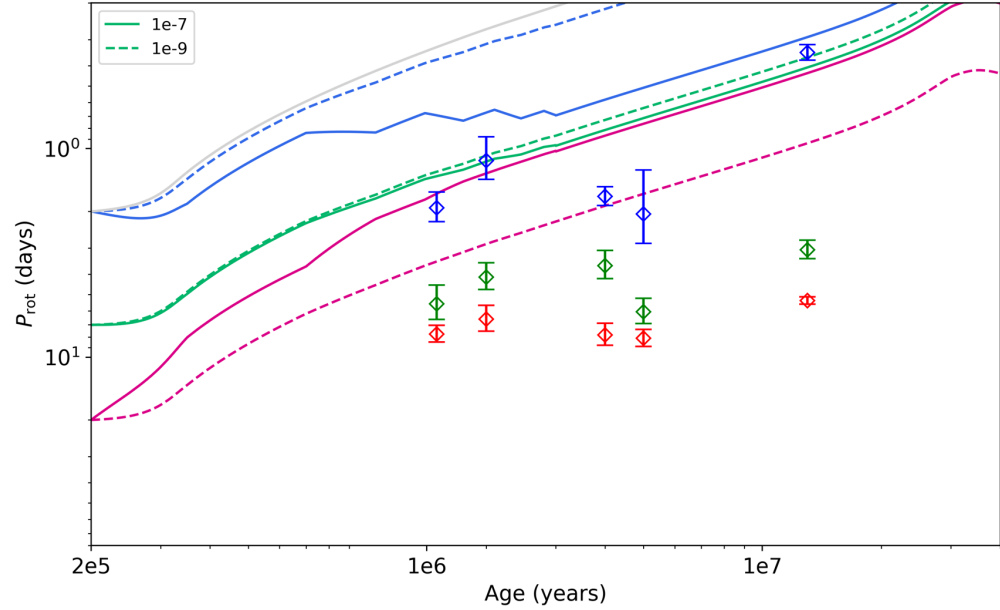
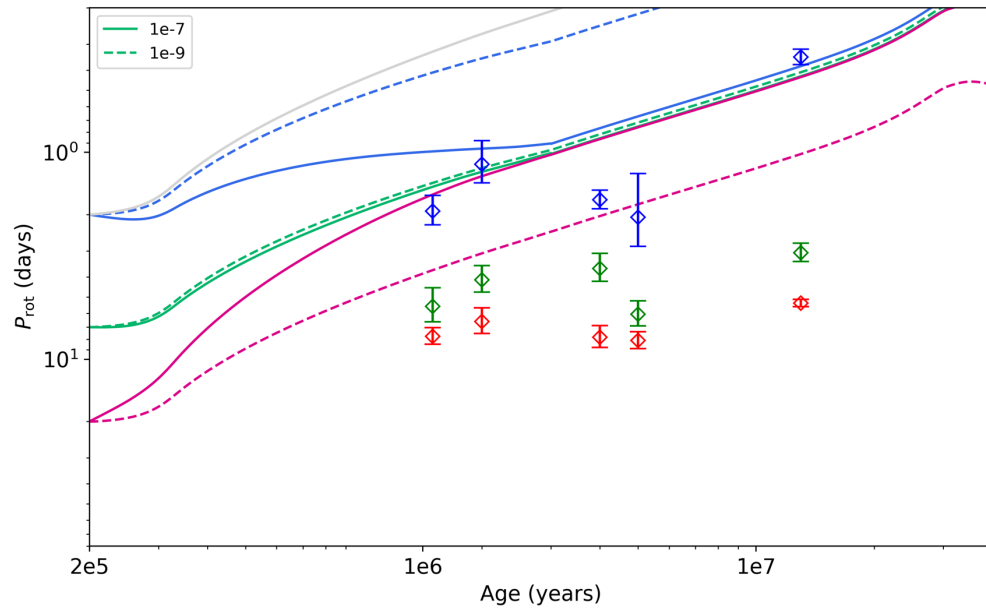
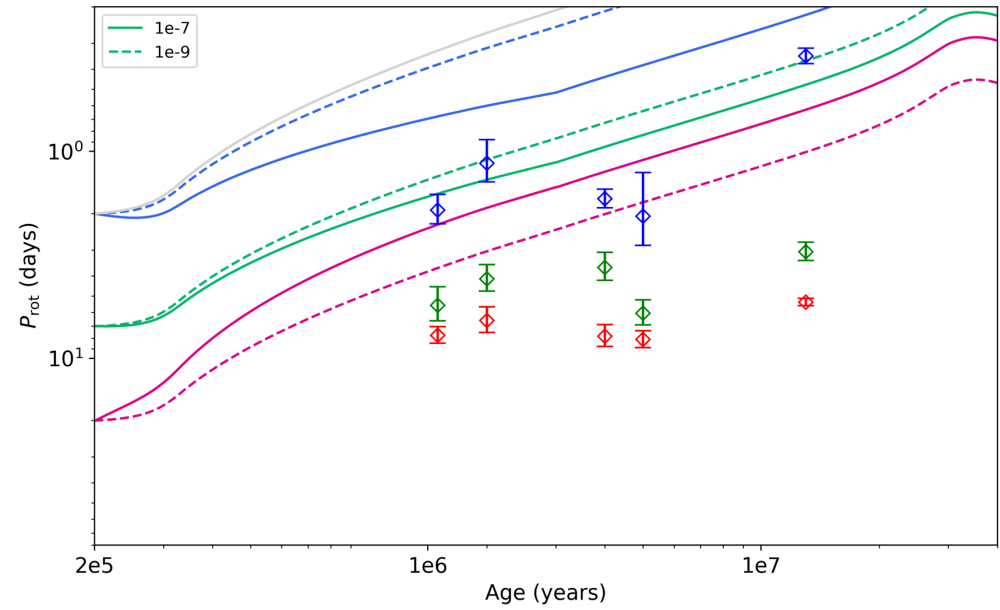


**Thank you! Questions?**

### GZA19



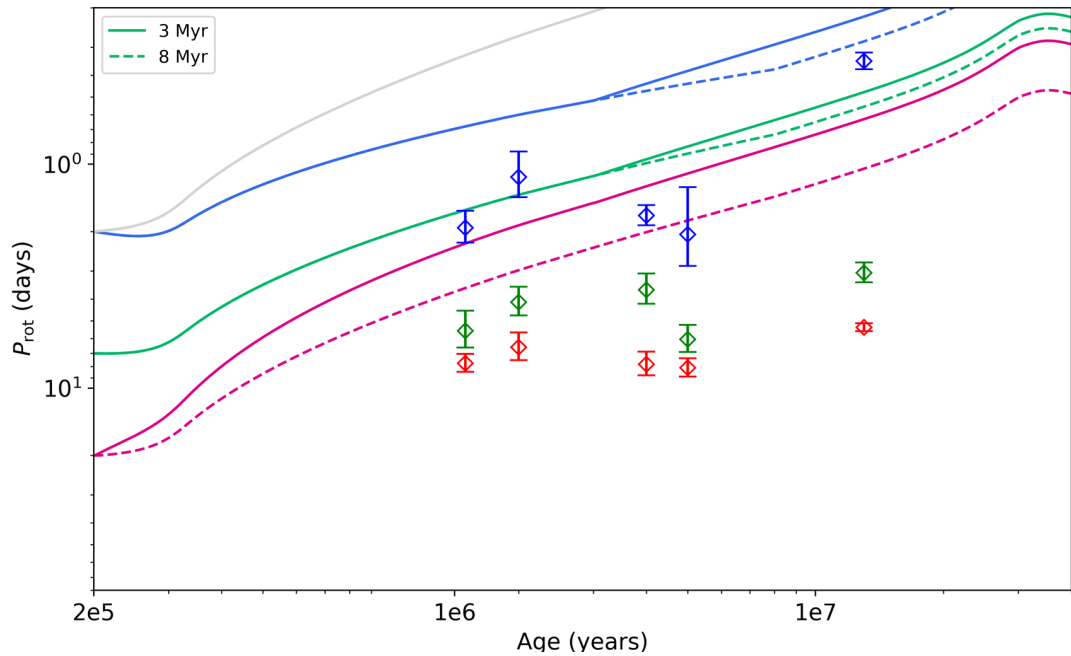
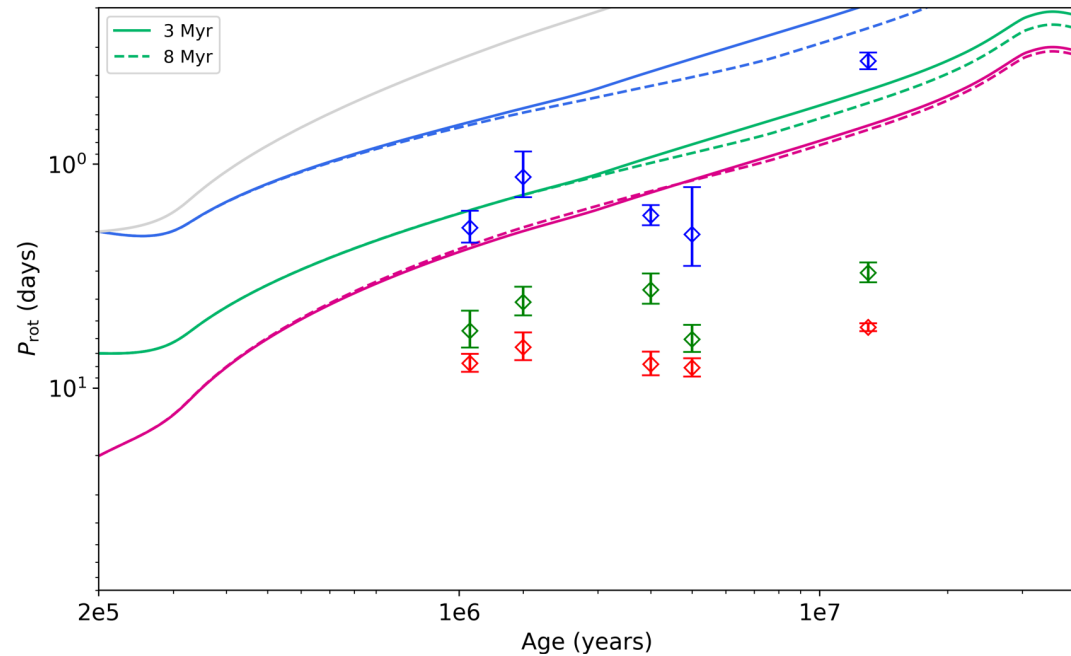
### Power Law



### Constant

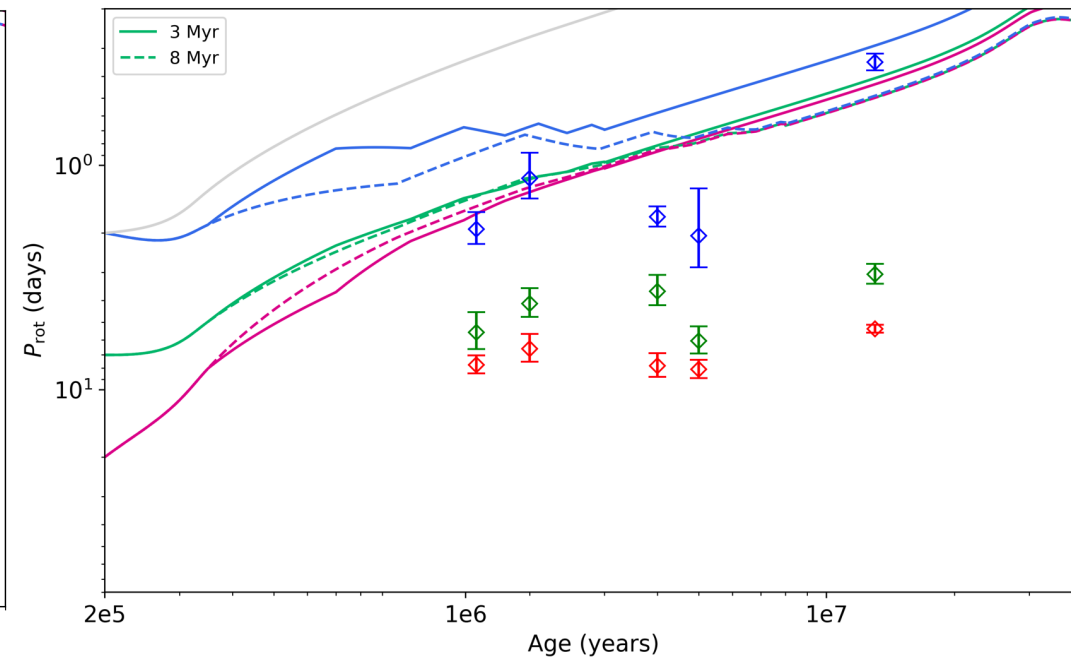
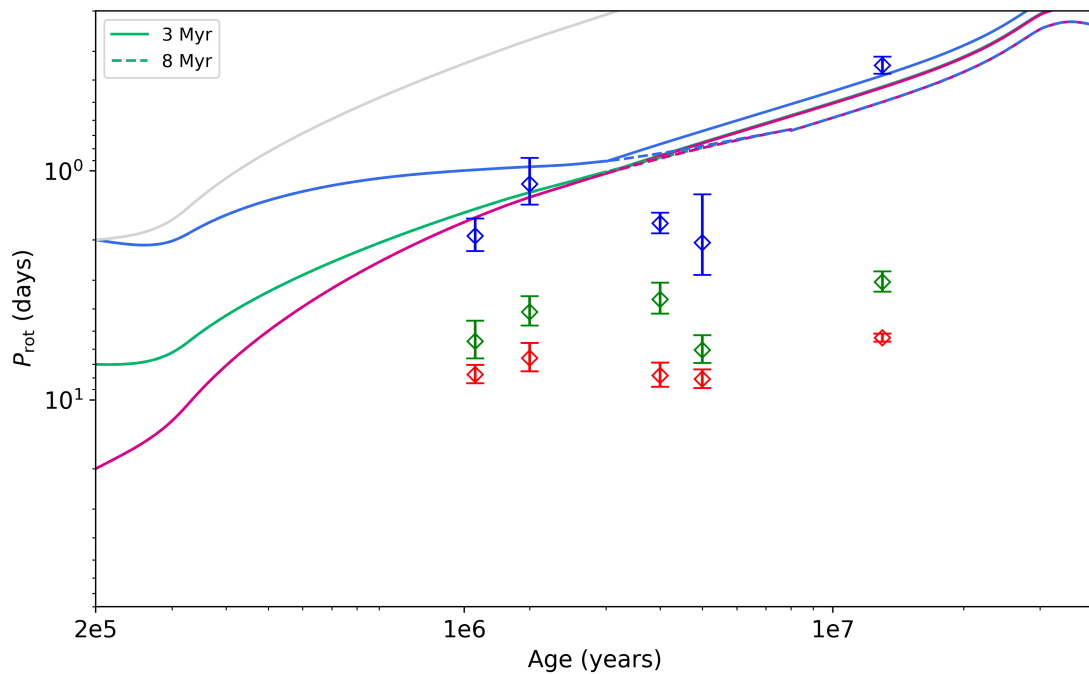
### Accretion Bursts

GZA19



Power Law

Constant



Accretion Bursts

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