# On the Magnetic Nature of the CV Period Gap


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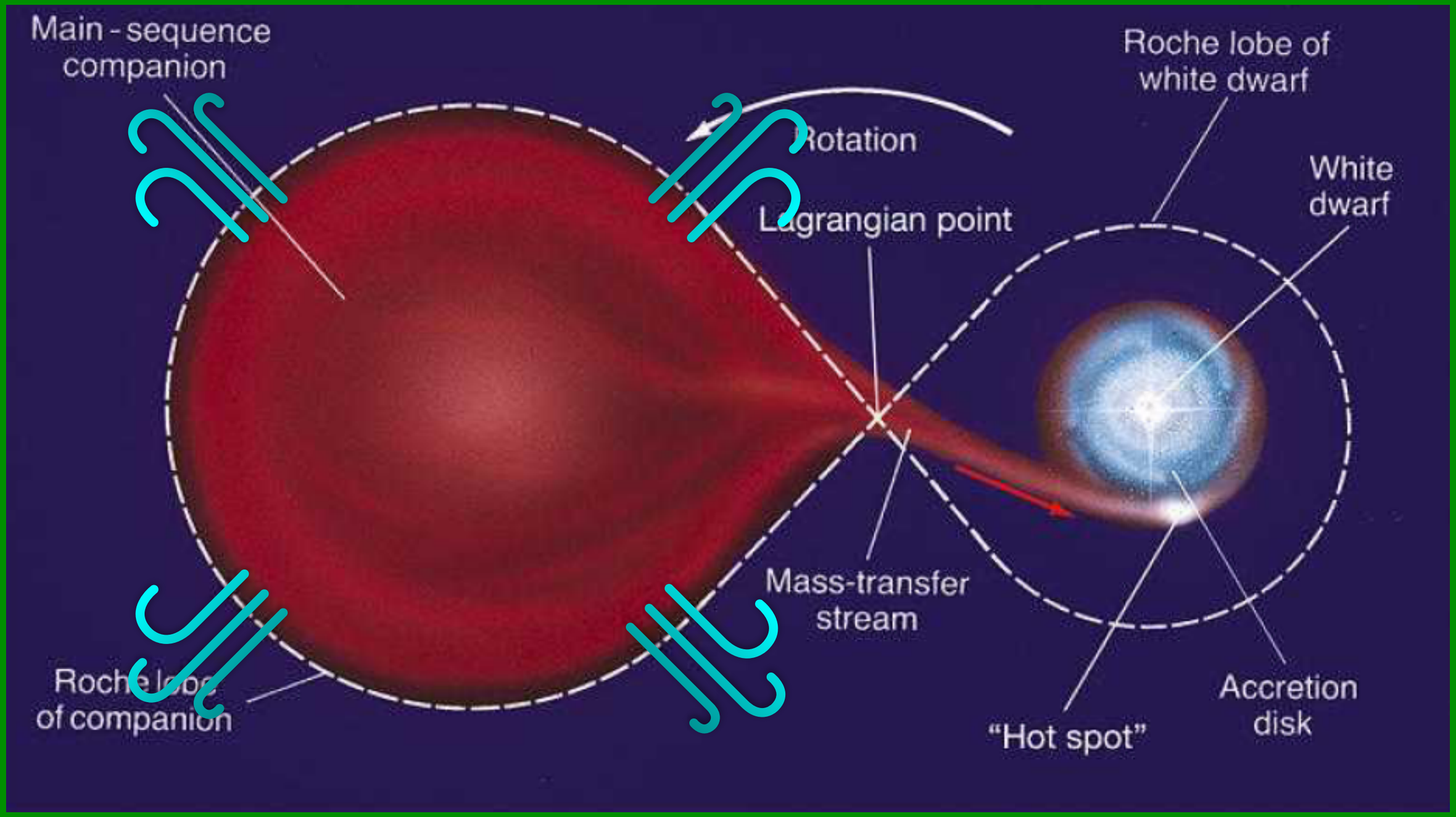
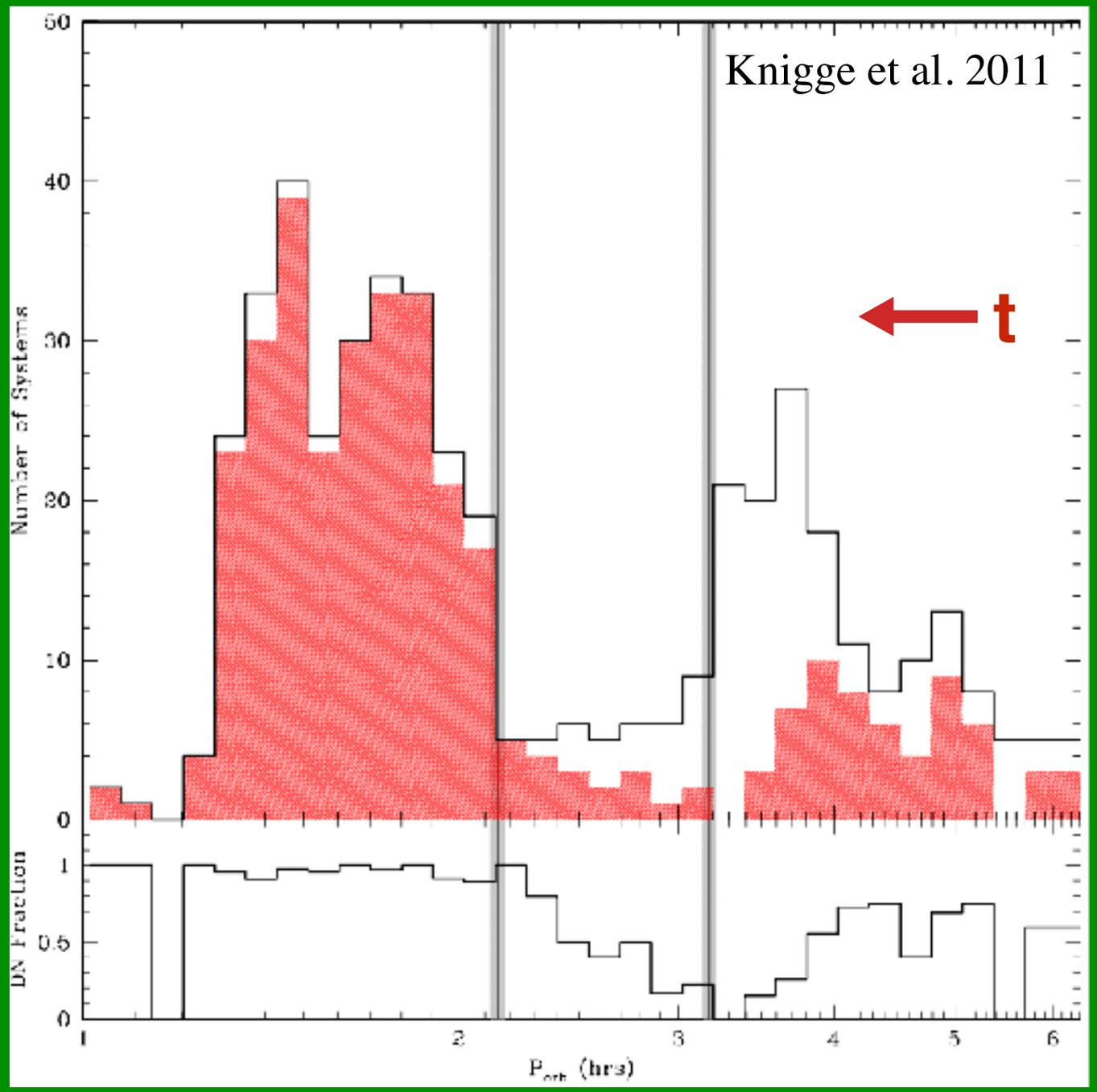
# Cataclysmic Variables



# Stellar Winds in Binary Systems

## CV Evolution:The Period Gap



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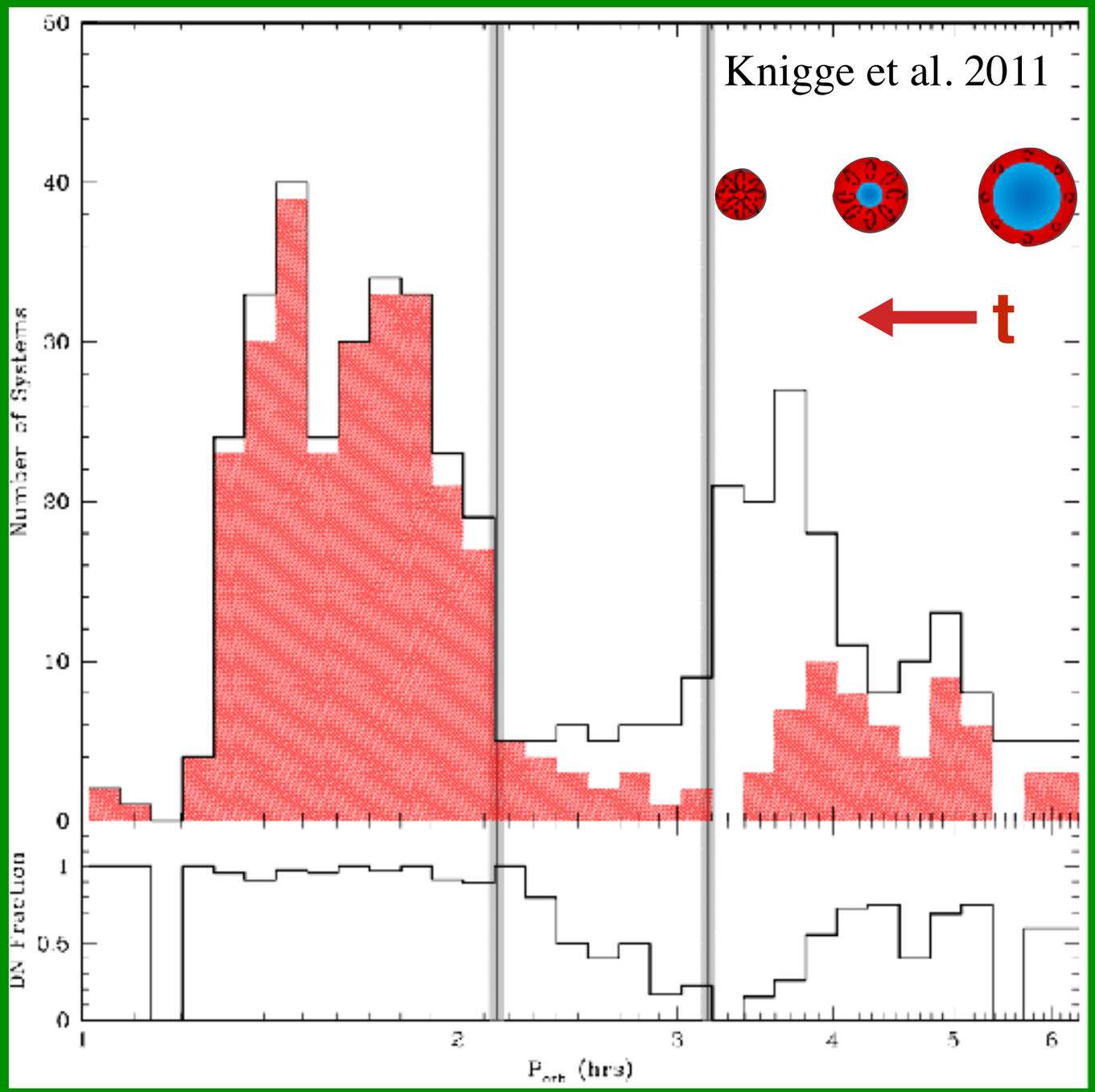


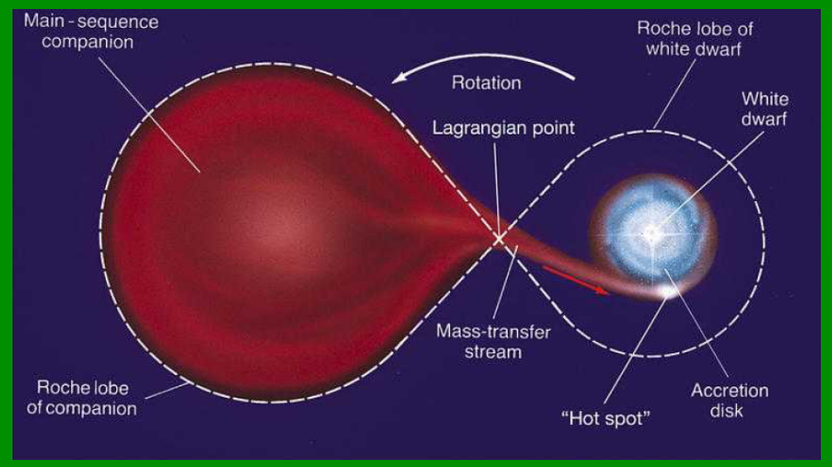

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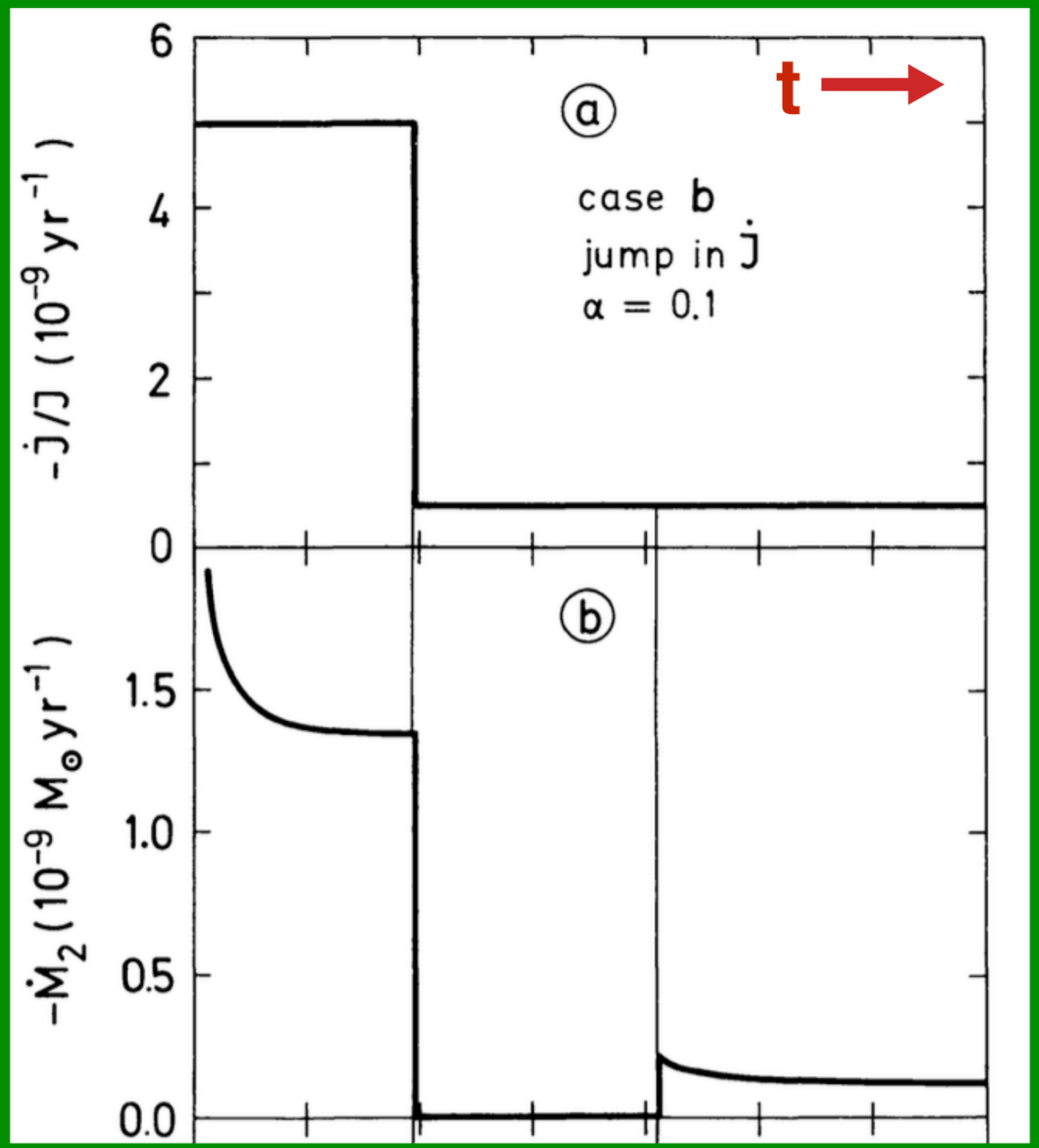


Spruit & Ritter 1983

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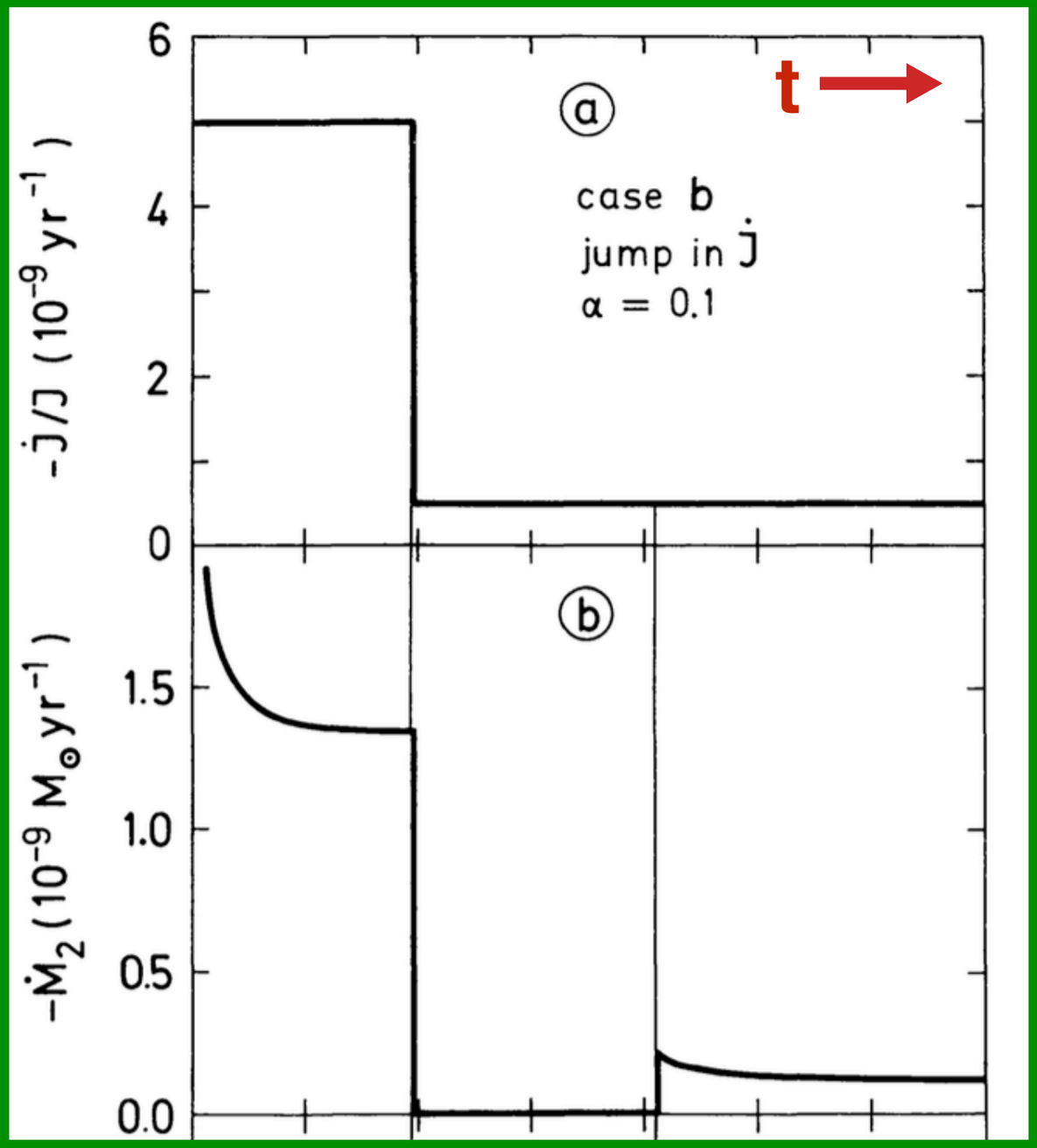
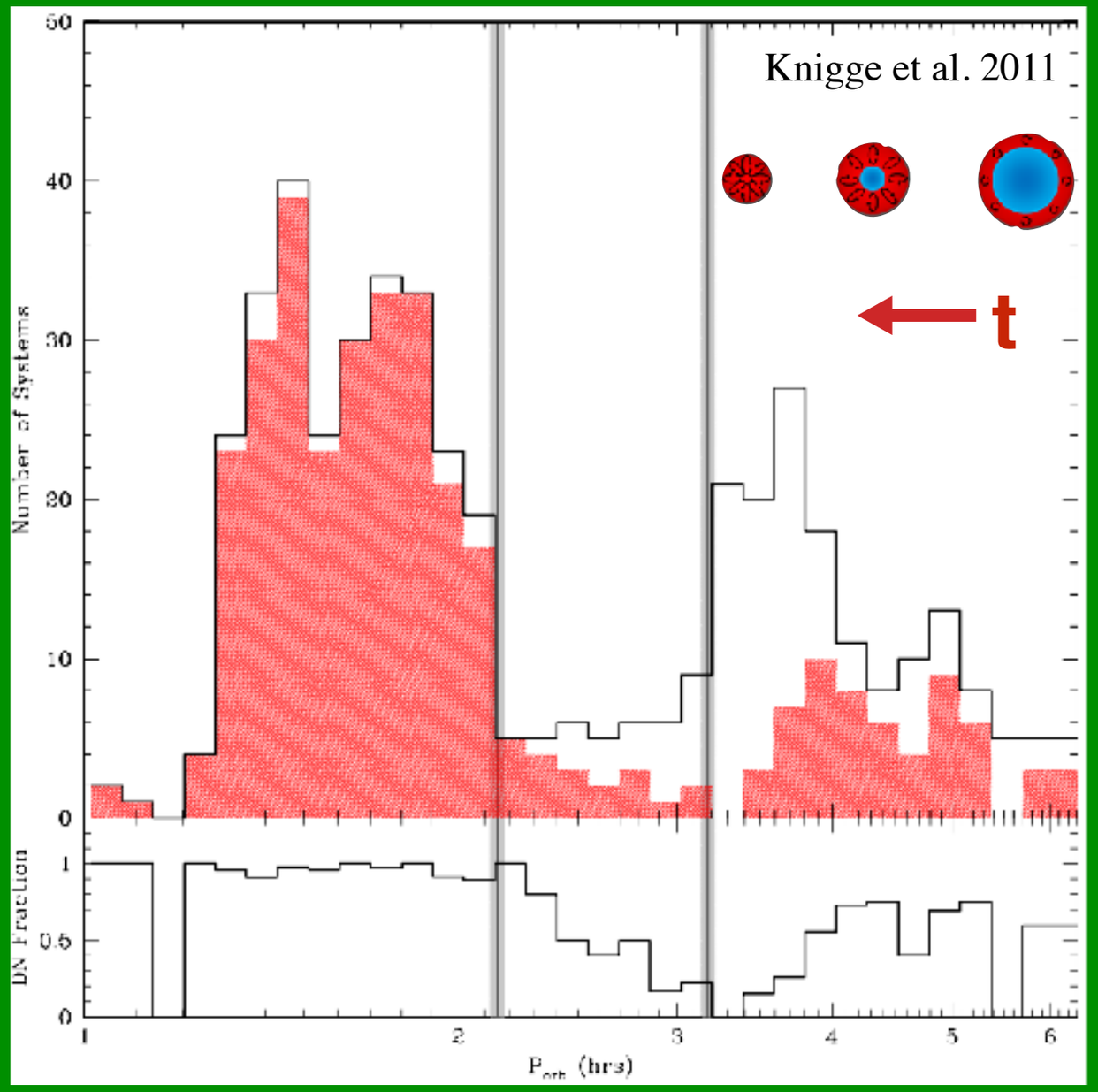



Spruit & Ritter 1983



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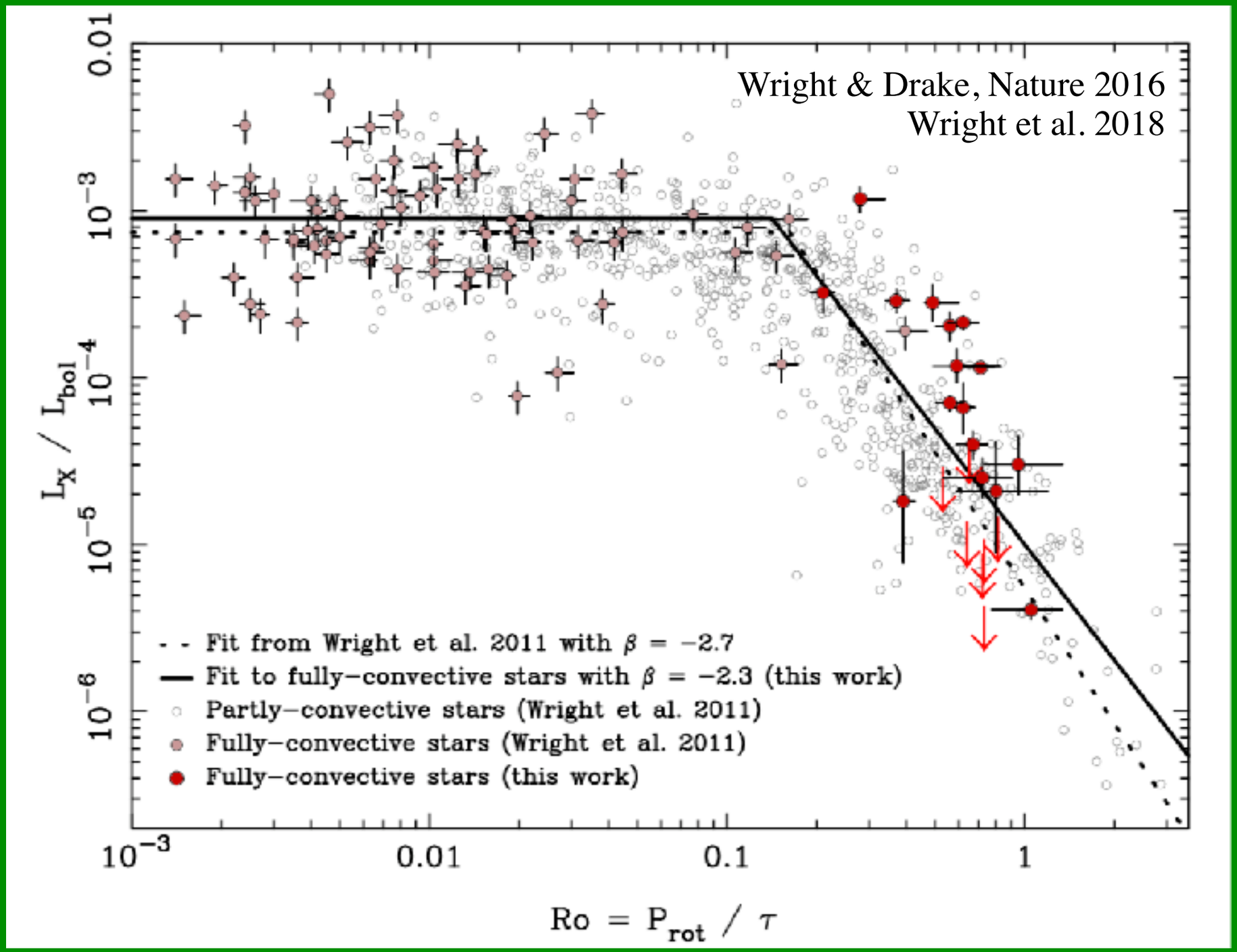
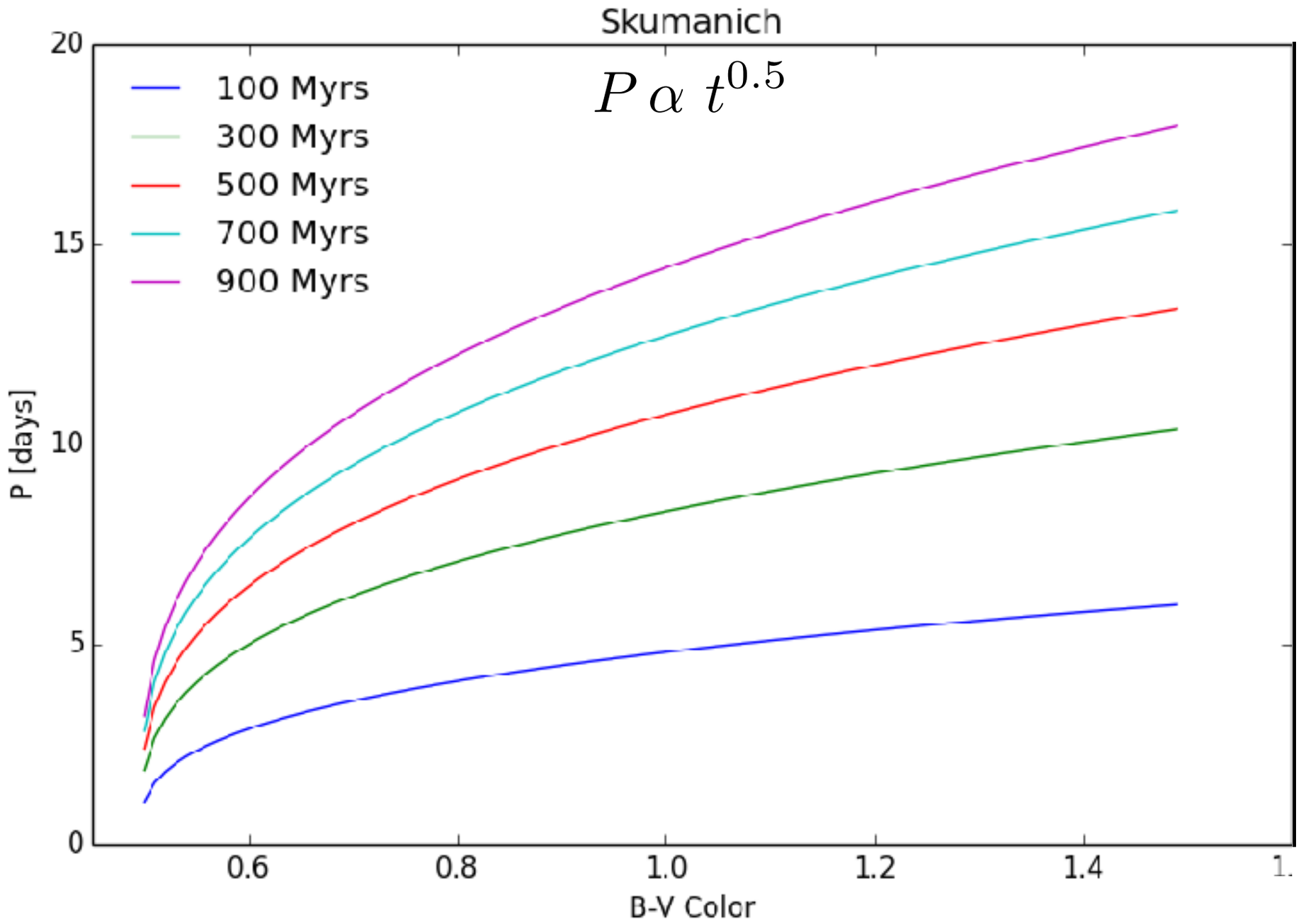
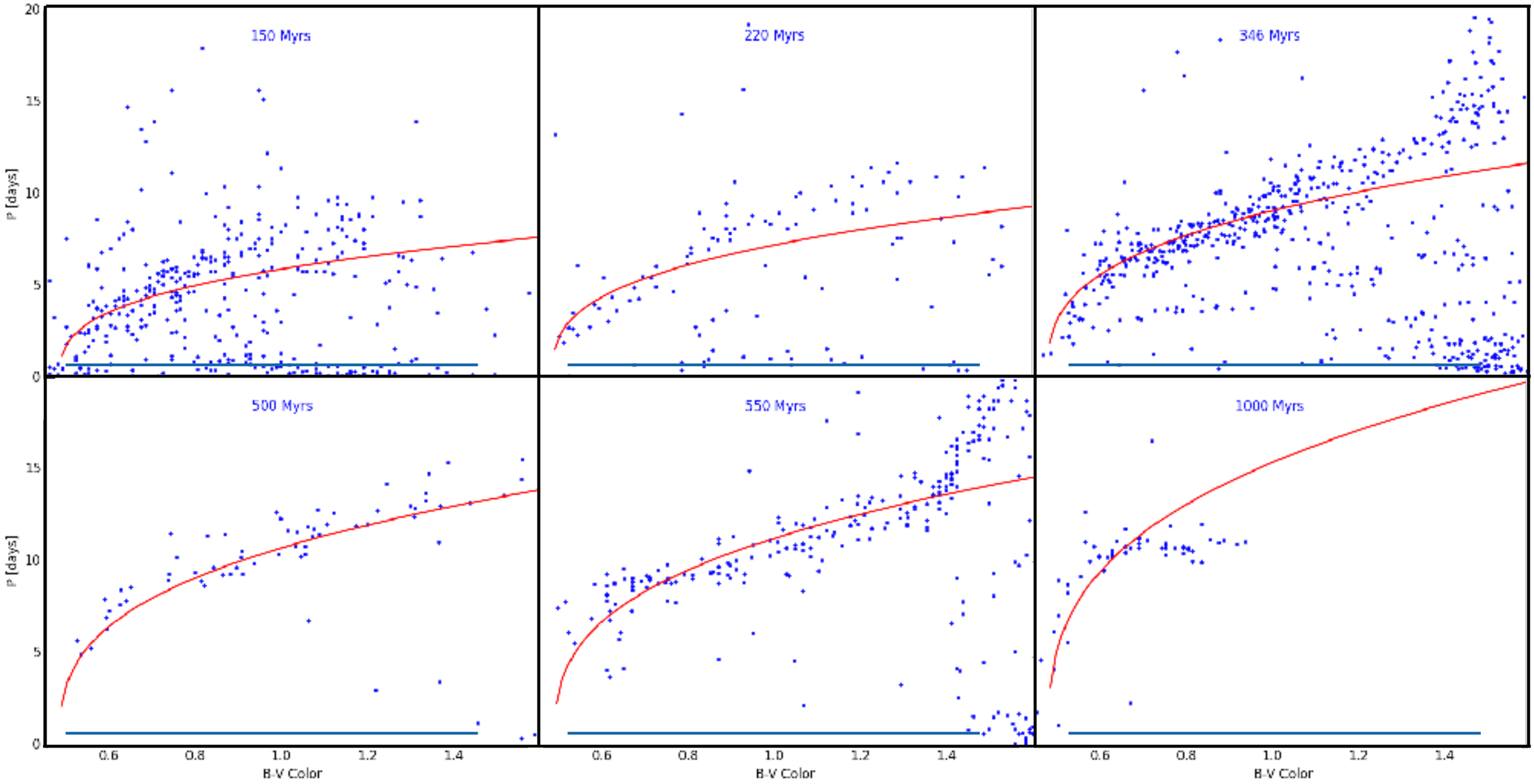


# Stellar Rotation

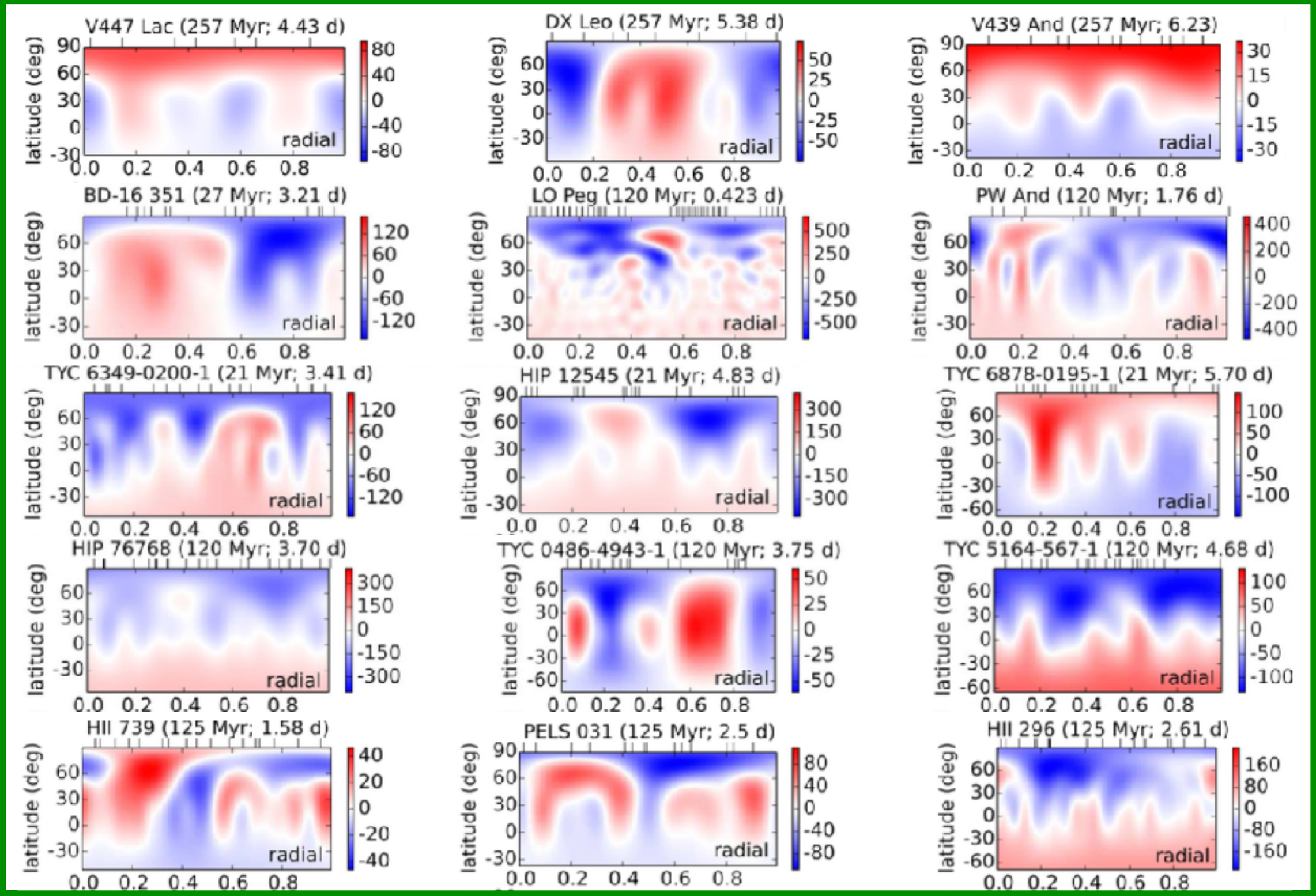



# Gyrochronology

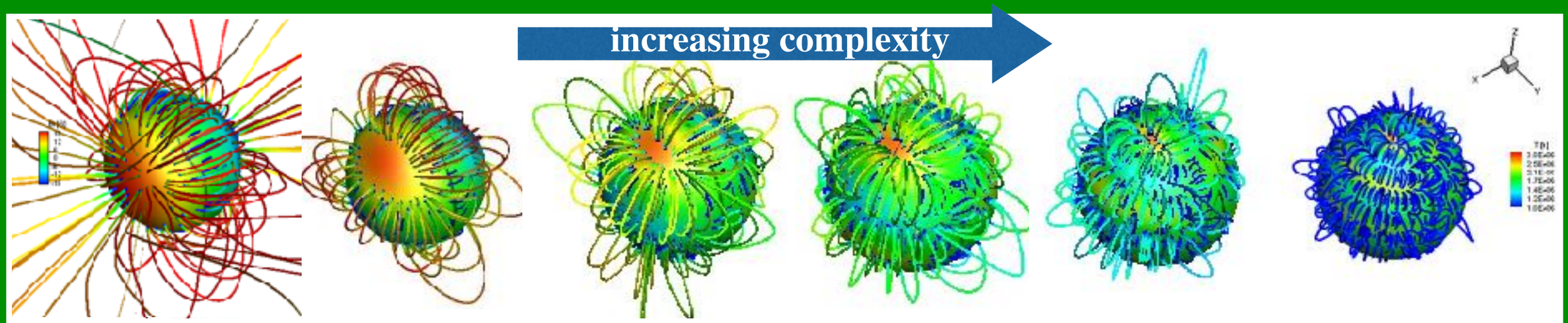
# Open Cluster Observations

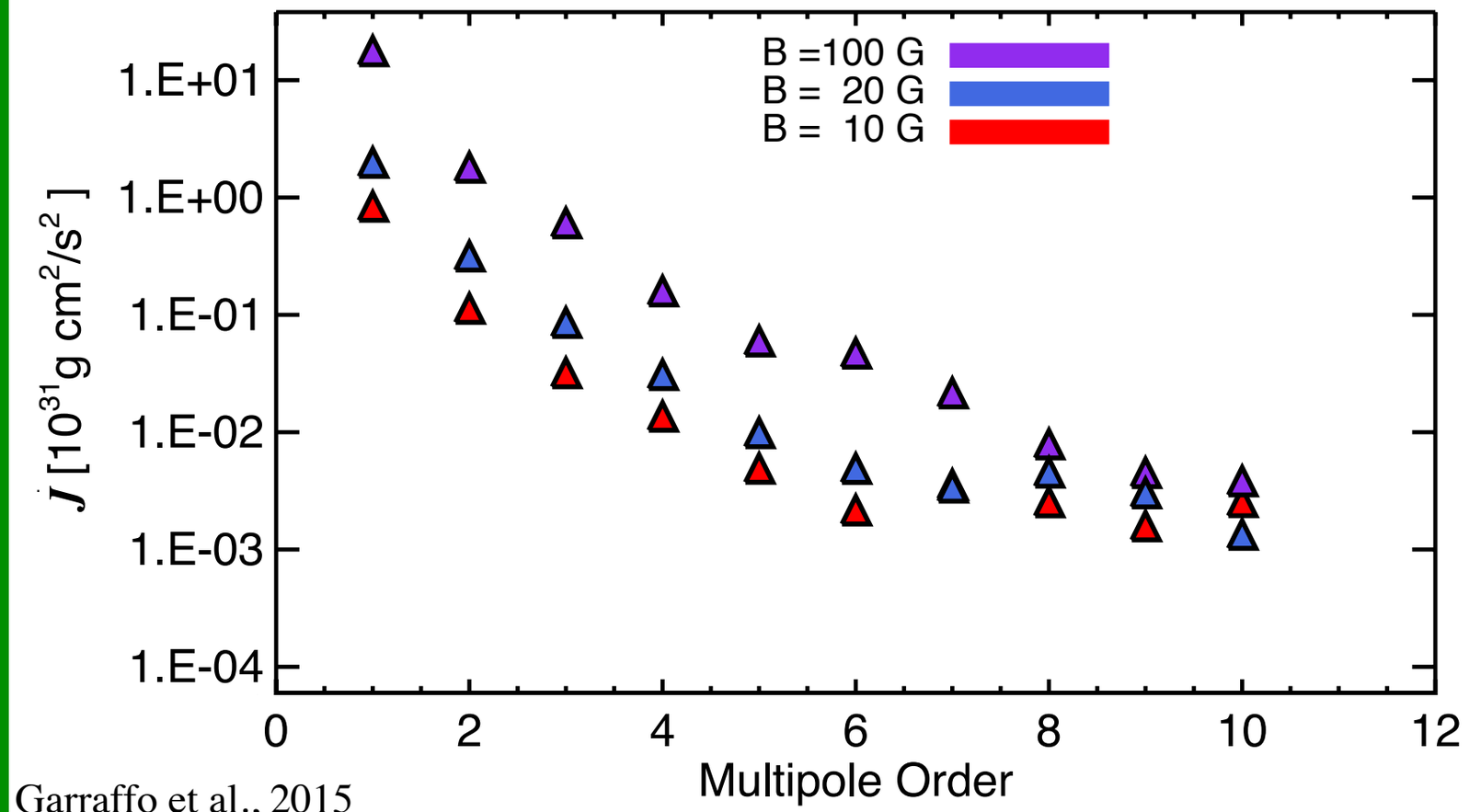


# Stellar Rotation



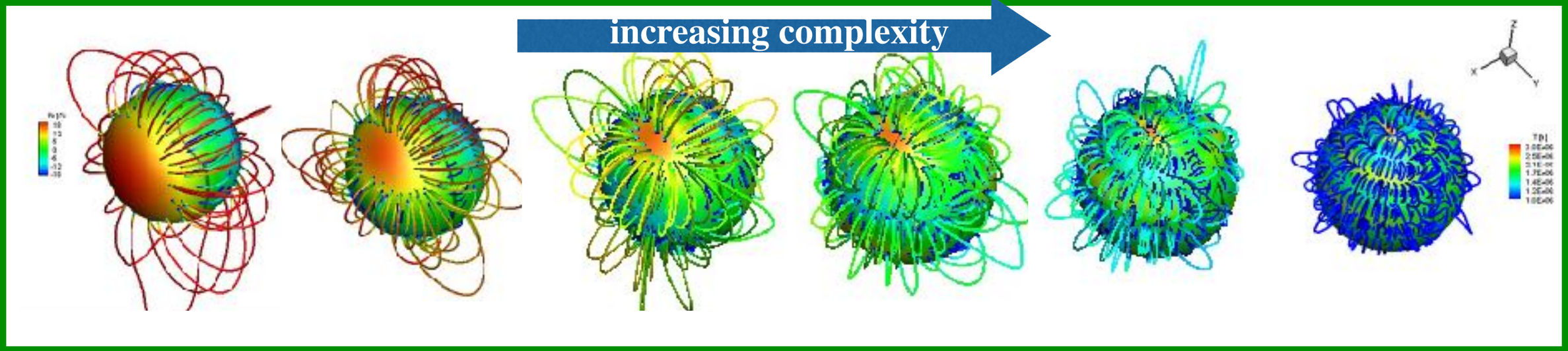
# Stellar Activity - Rotation




Garraffo et al., 2015

# Stellar Activity - Rotation



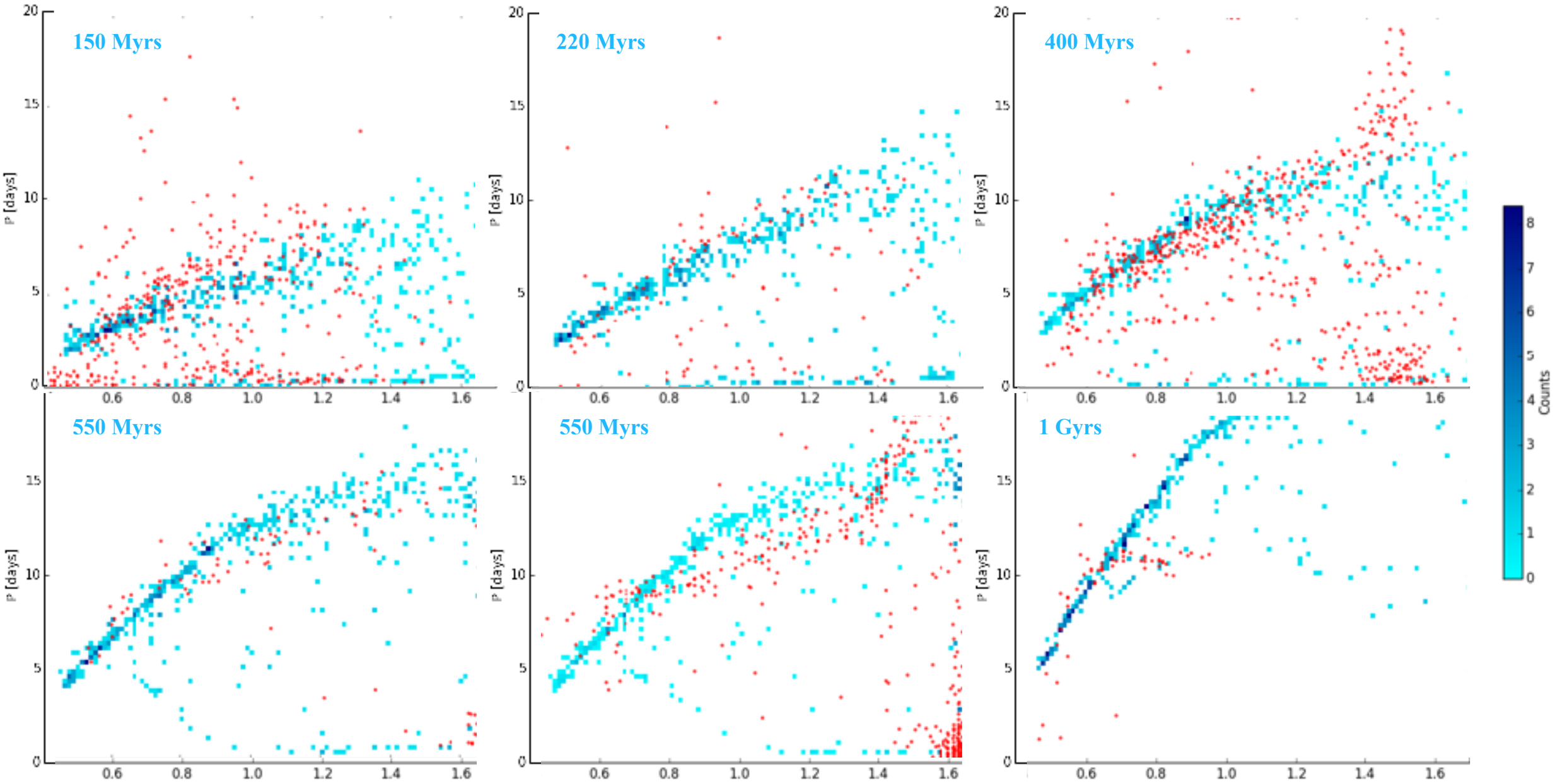

$$\dot{J} = \dot{J}_{Dip} Q_J(n) \;,\; Q_J(n) = 4.05\, e^{-1.4n}$$

Skumanich

$$\dot{J}_{Dip} = c\ \Omega^3 \tau$$

# A Complete Spin-down Model

$$\dot{J} = \dot{J}_{Dip} Q_J(n)\ ,\ Q_J(n) = 4.05\, e^{-1.4n} \longrightarrow n = 0.02/Ro + 2Ro + 1$$

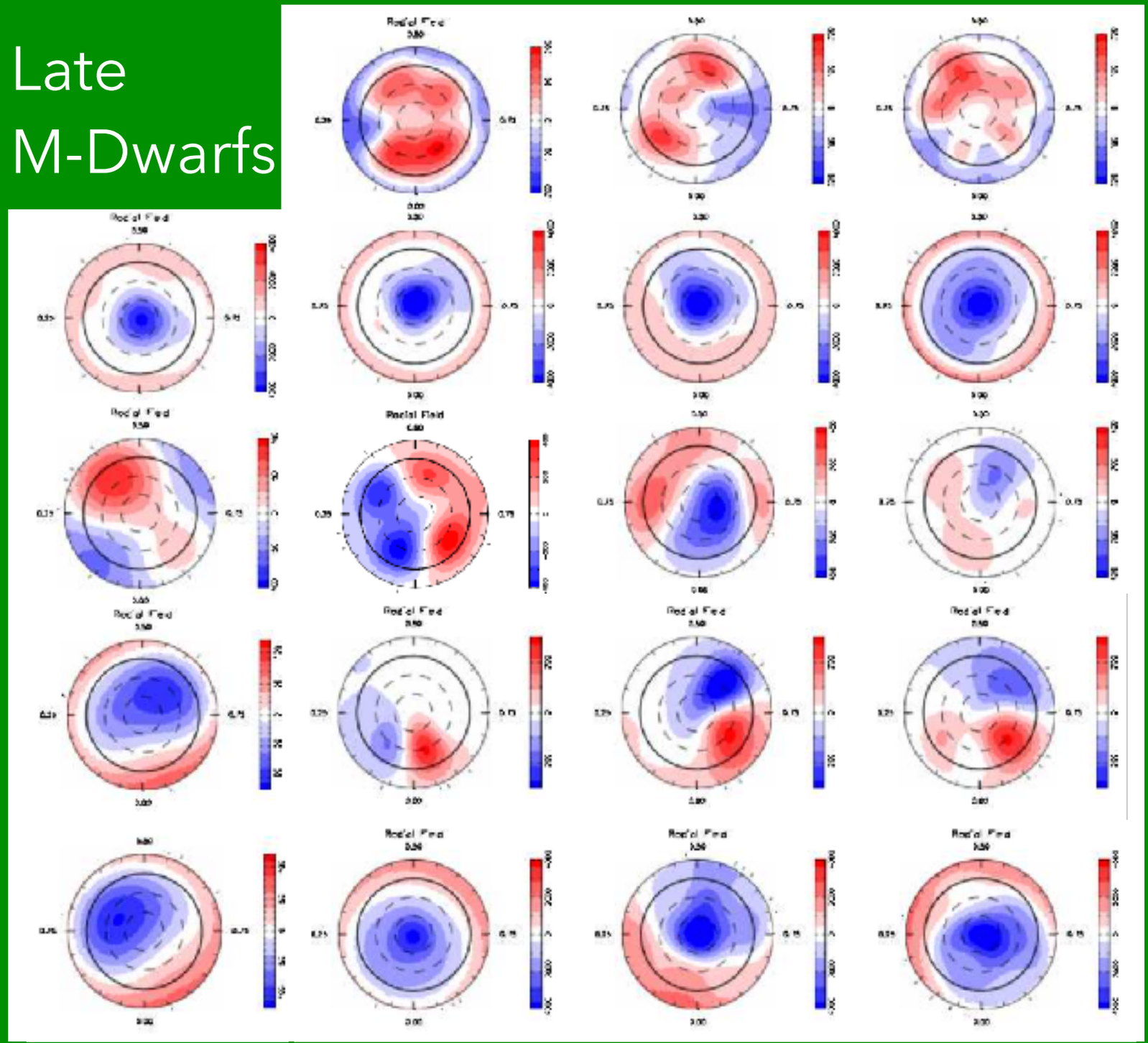



Garraffo et al. 2018

# Stellar Winds in Binary Systems

## CV Evolution:The Period Gap

Late
M-Dwarfs



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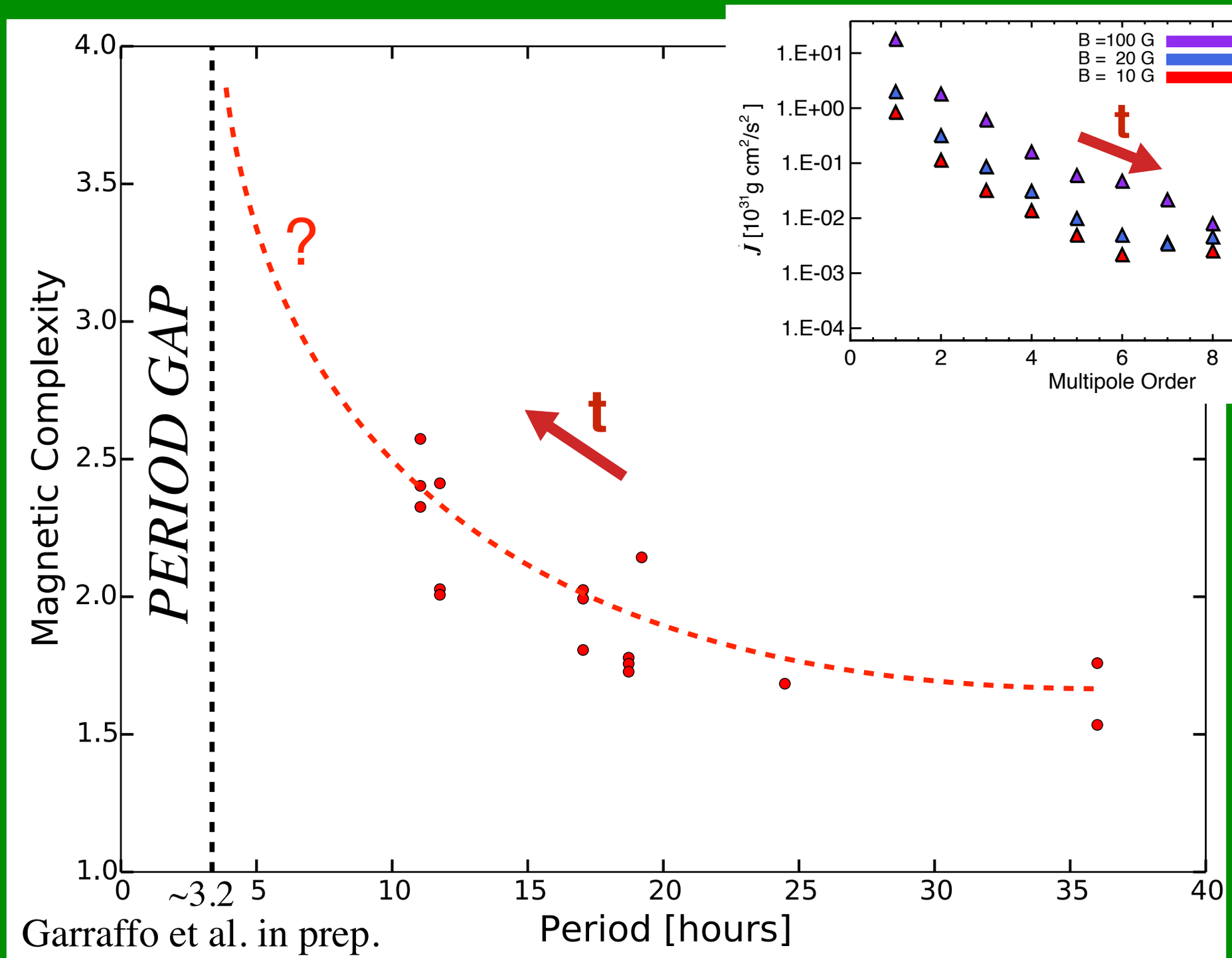

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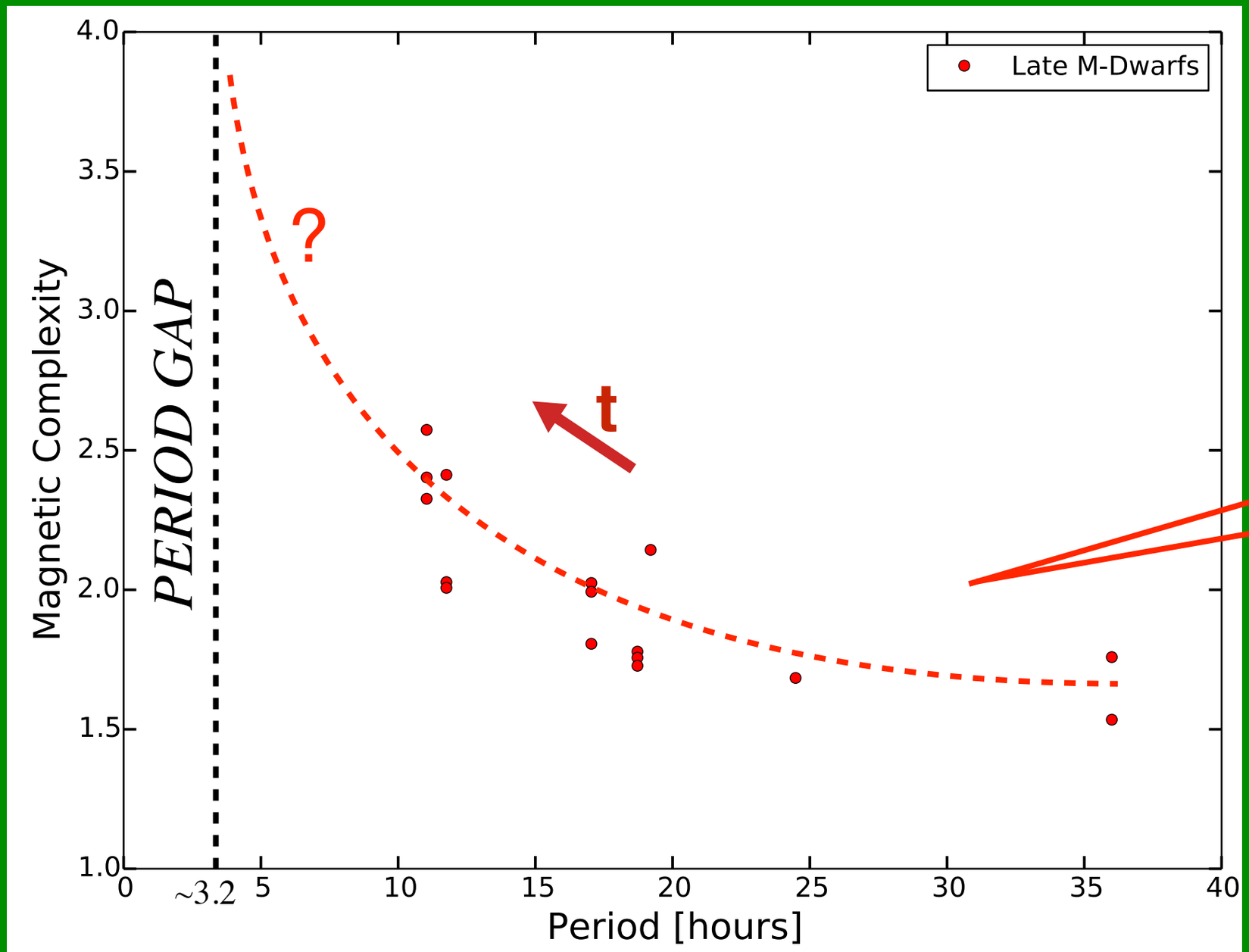


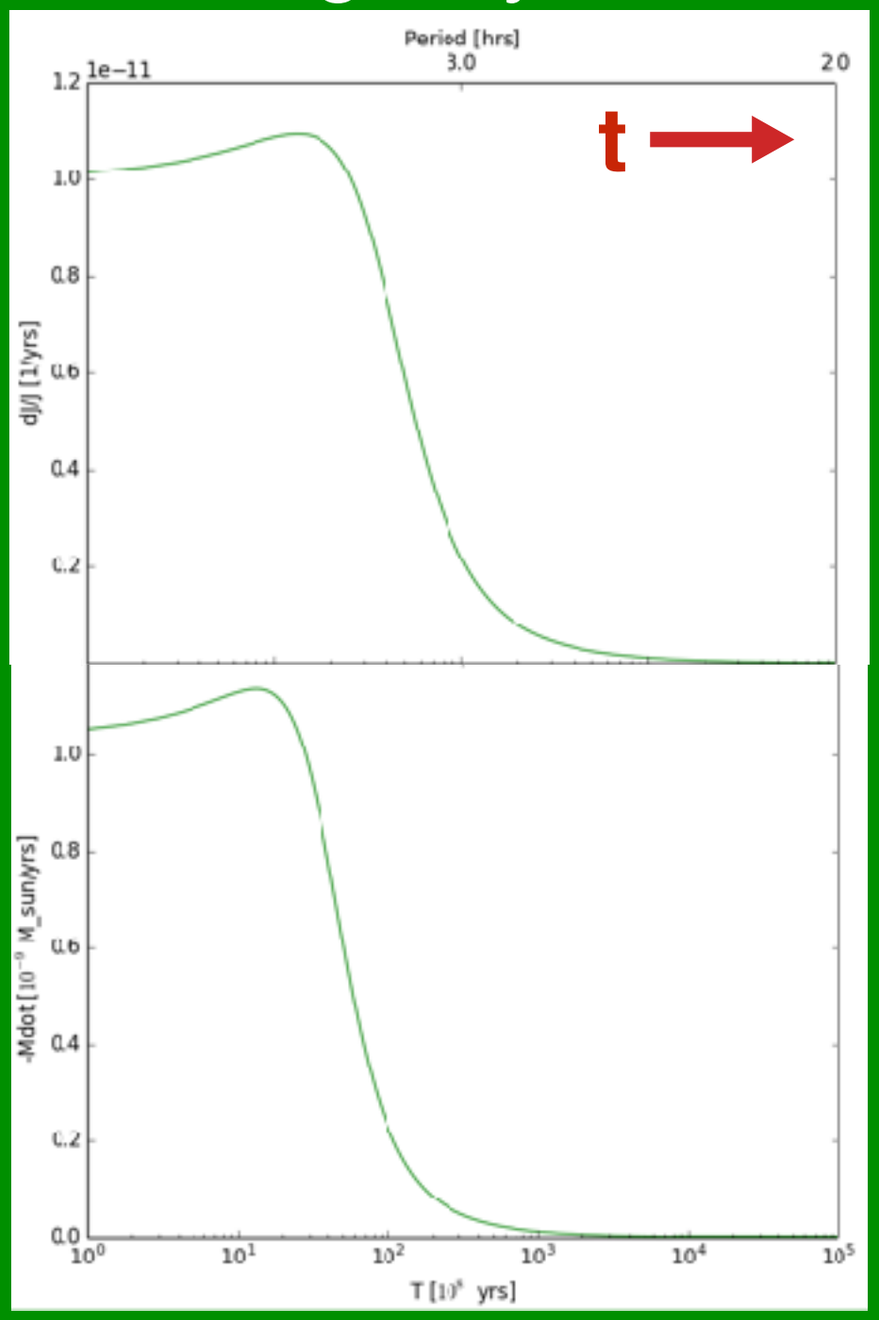

$$\dot{J} = \dot{J}_{Dip} Q_J(n)$$

$$Q_J(n) = 4.05\, e^{-1.4n}$$

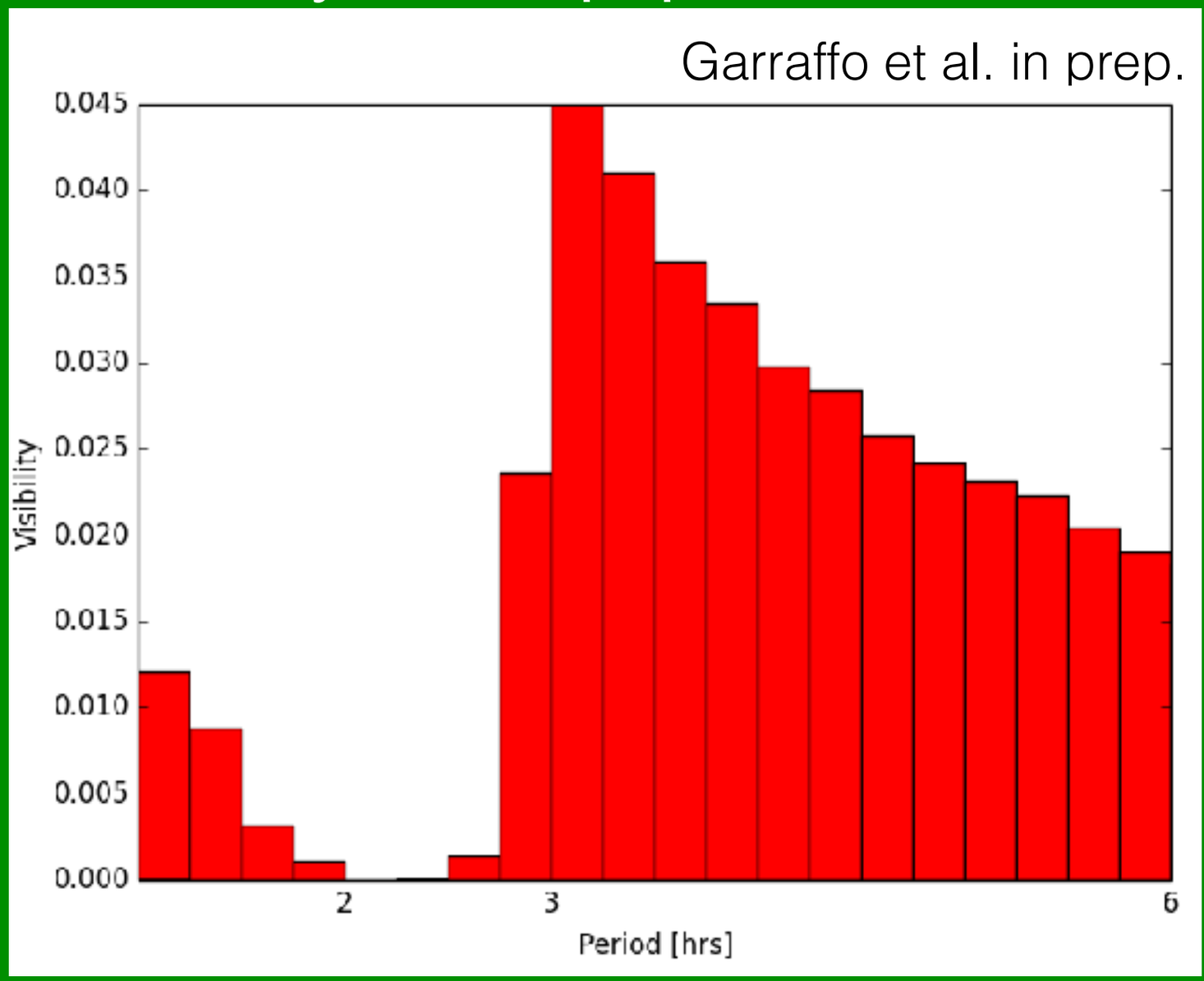
# Stellar Winds in Binary Systems

## CV Evolution:The Period Gap

### Single system




### Synthetic populations



# Summary

- Magnetic complexity is the missing ingredient for a complete spin-down model

- Magnetic complexity increases as stars spin-up in binary systems, leading to a magnetic braking “interruption”

- The CV period gap naturally results from stellar magnetic evolution

*"The answer is blowing in the wind..."*

*Thank you!*