

The binary fraction of dwarf  
carbon stars and their possible  
role as carbon enhanced  
metal-poor star progenitors

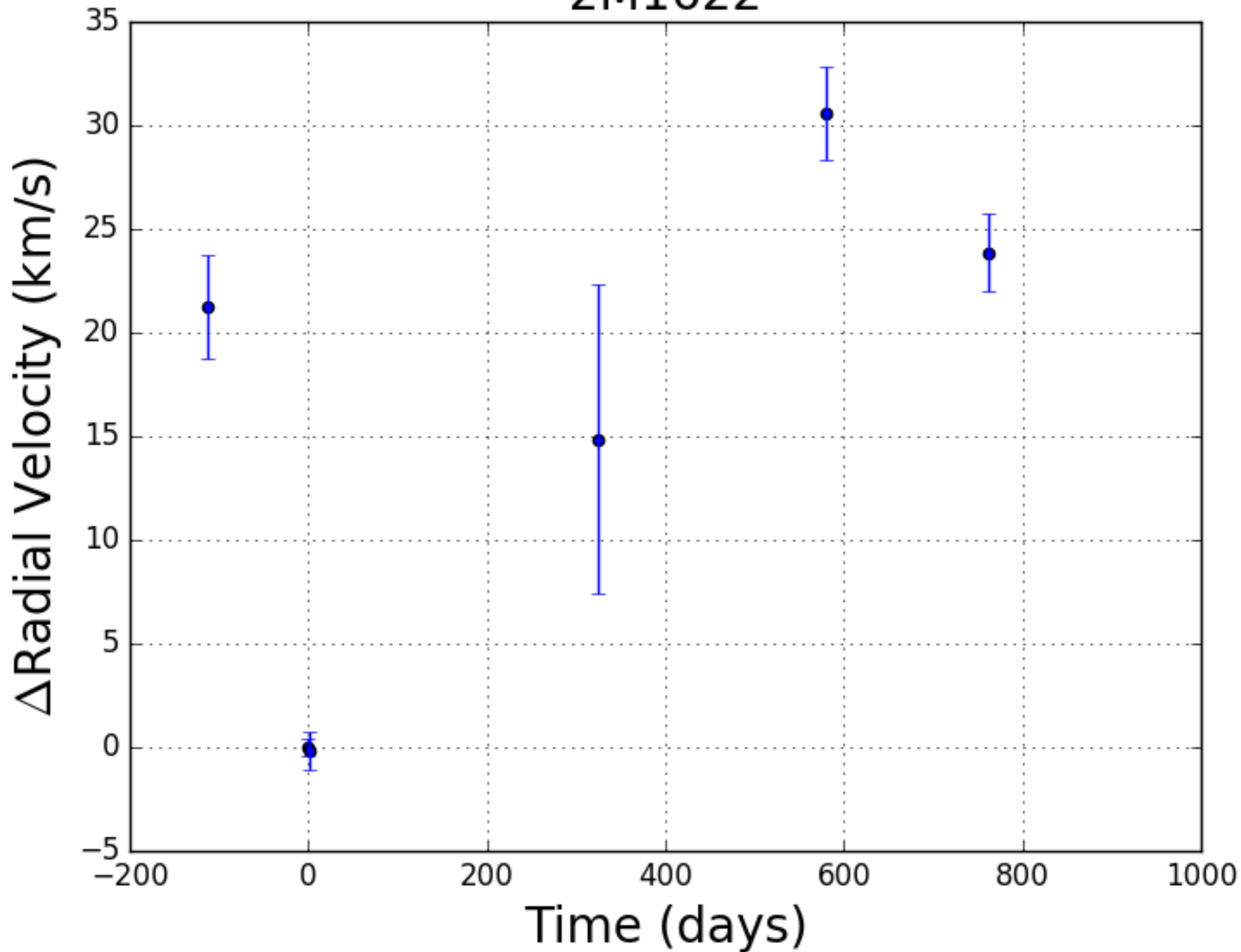
Lewis Whitehouse, Jay Farihi  
University College London



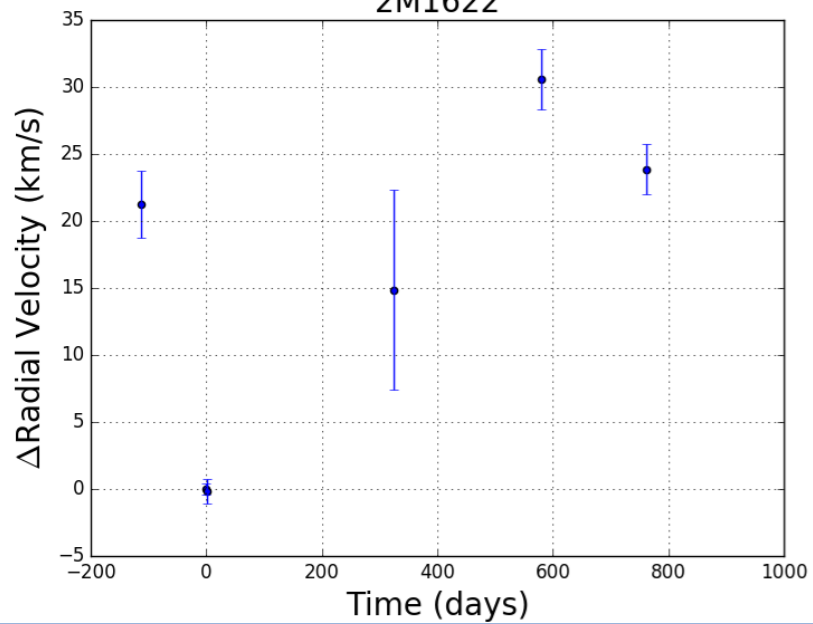
# The dC star mystery

- dC stars have typical carbon (giant) spectra
- Red dwarf stars with  $C/O > 1$
- What is the origin of the carbon abundance?
- What are the galactic origins of dC stars?

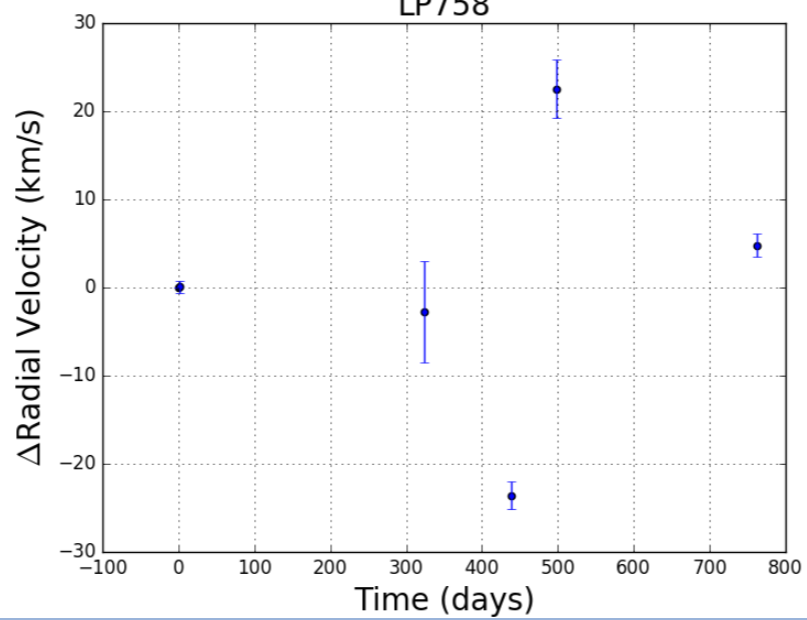
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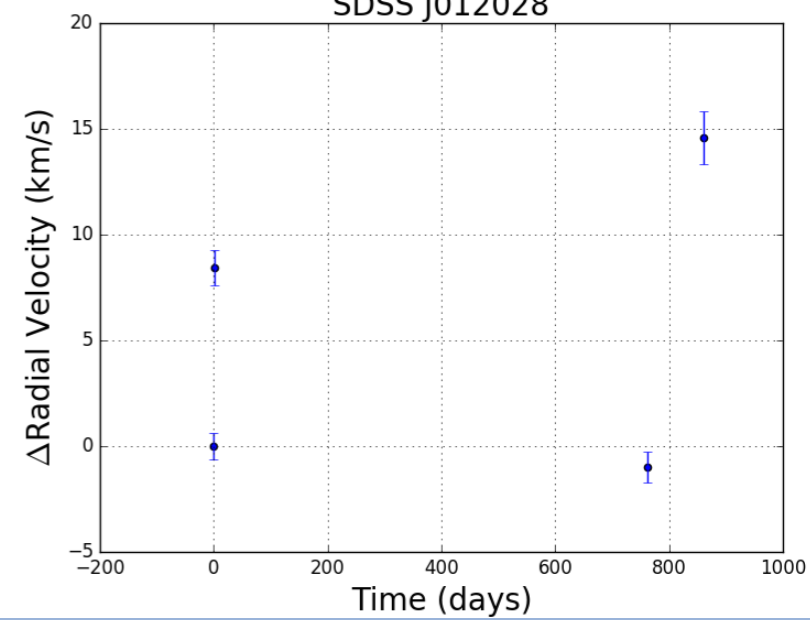
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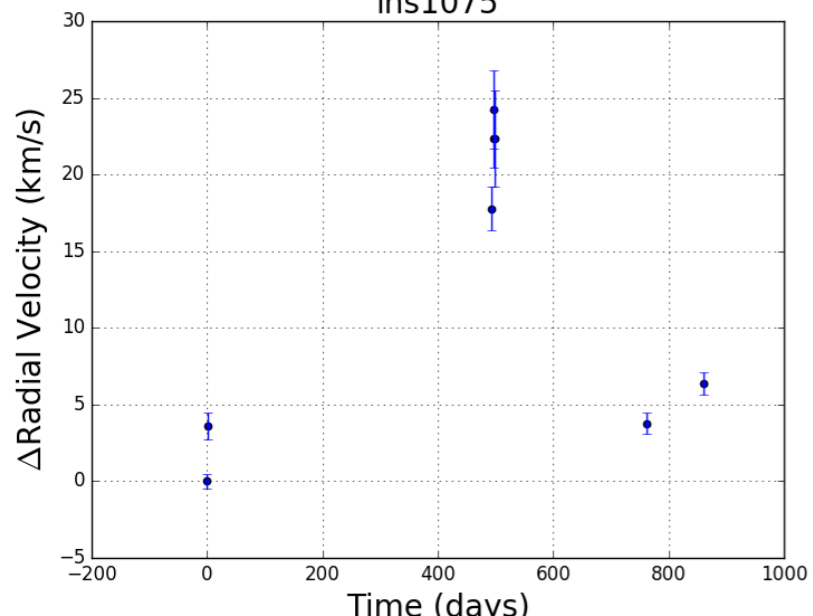
LP758



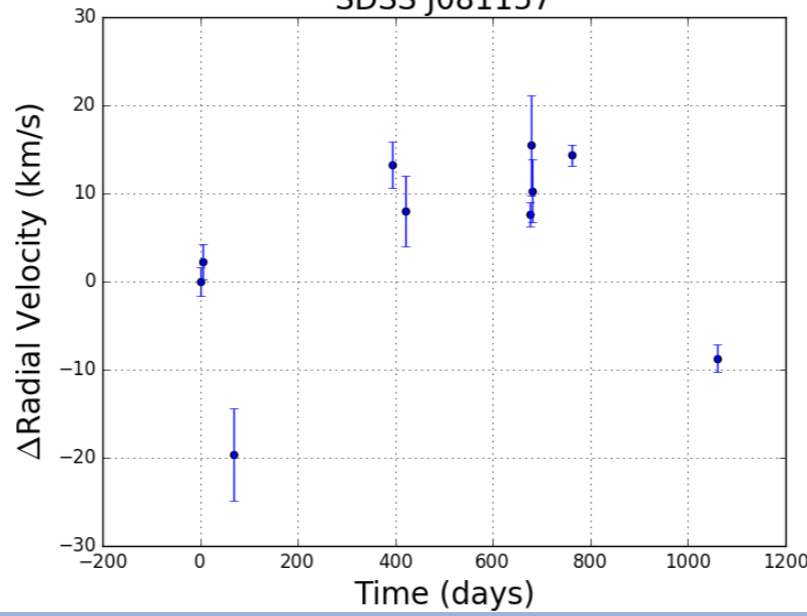
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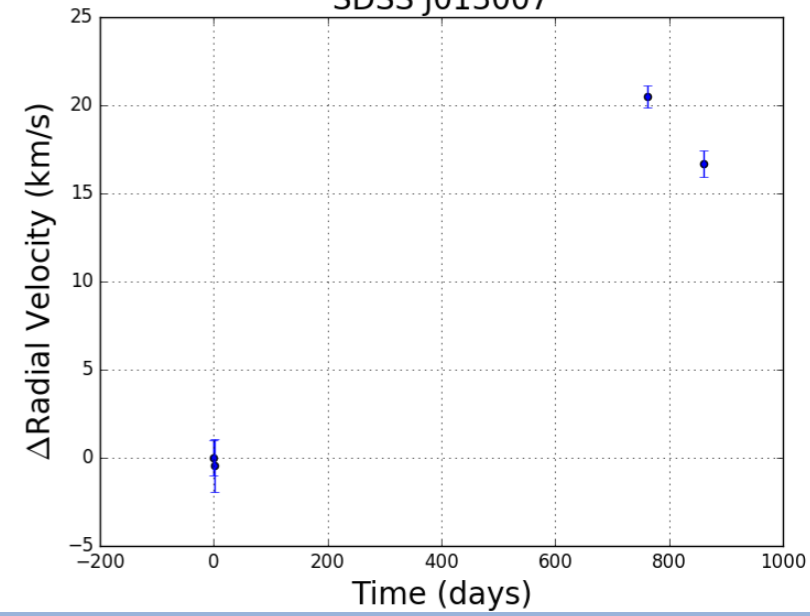
lhs1075



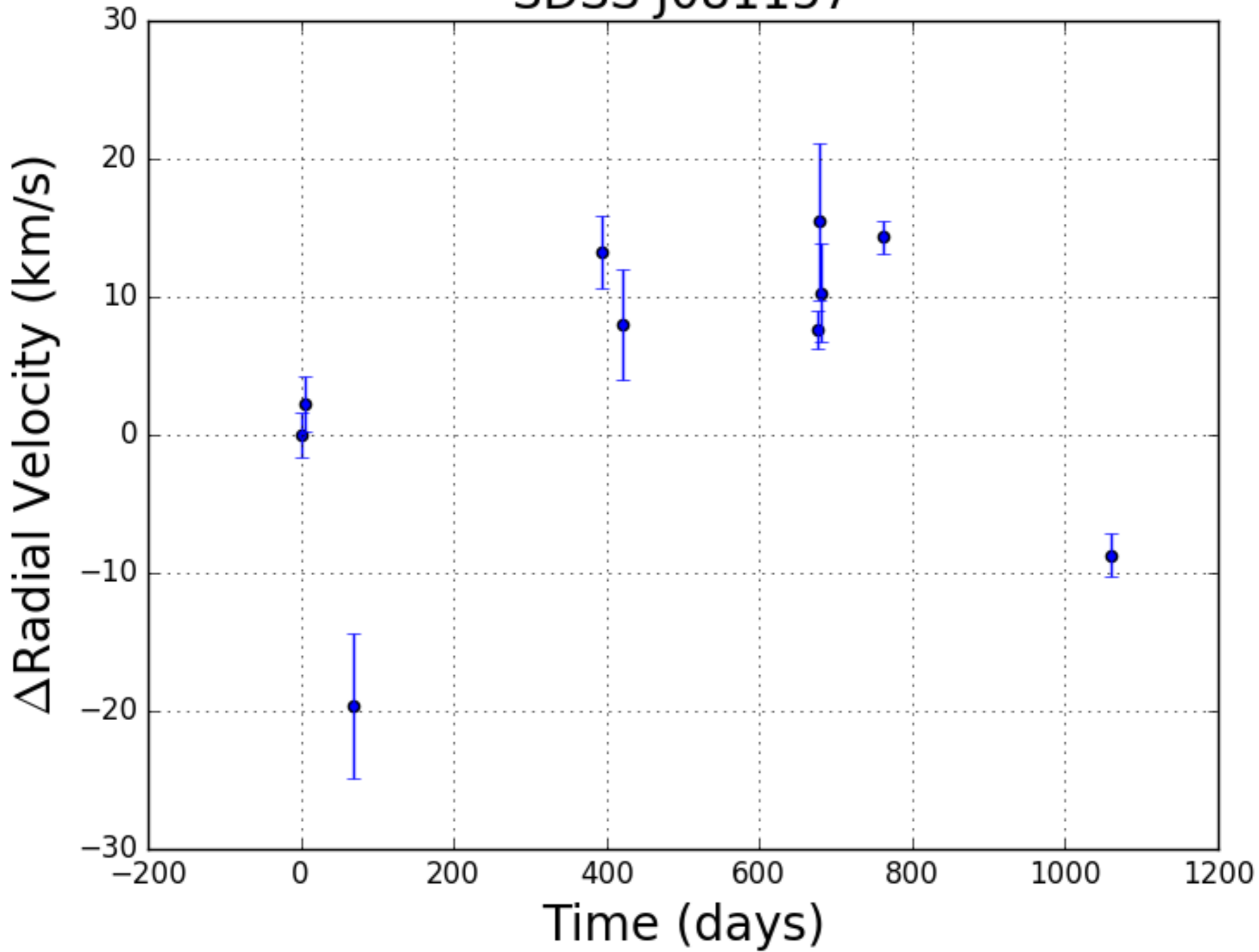
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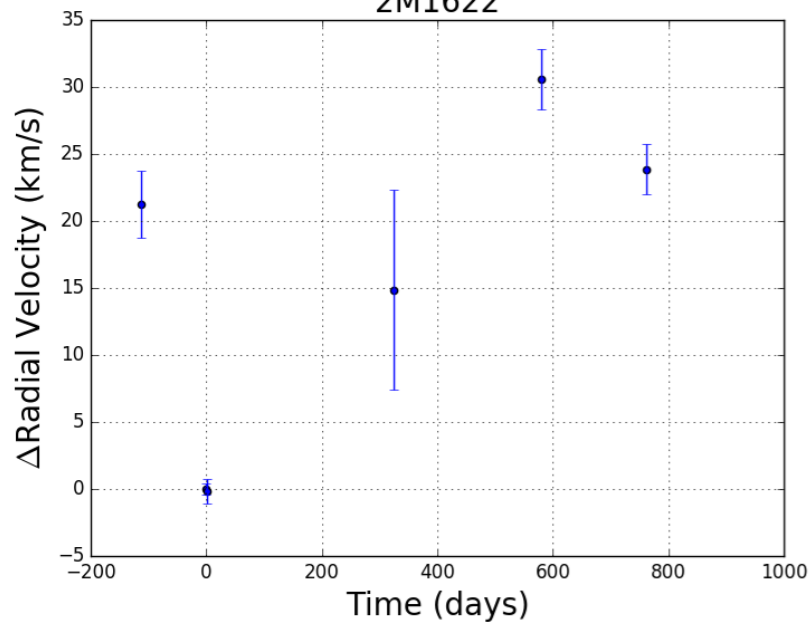
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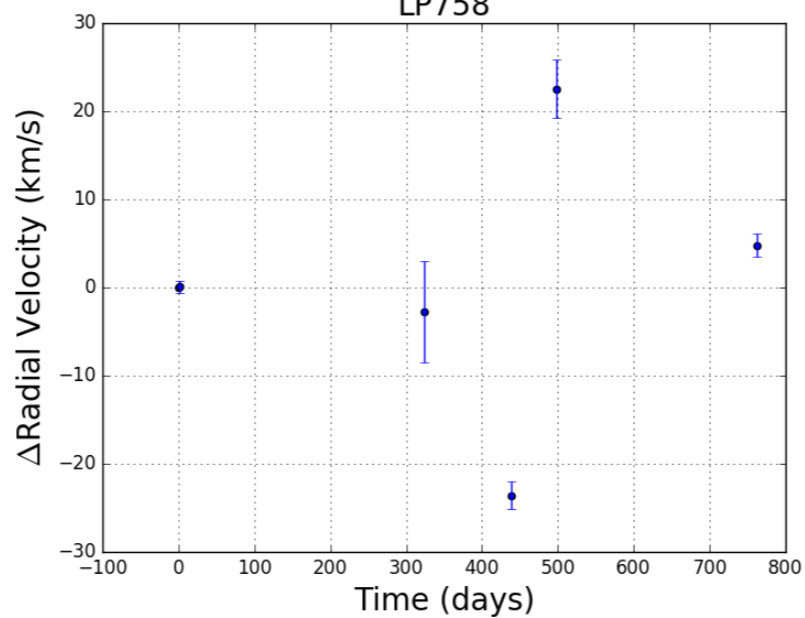
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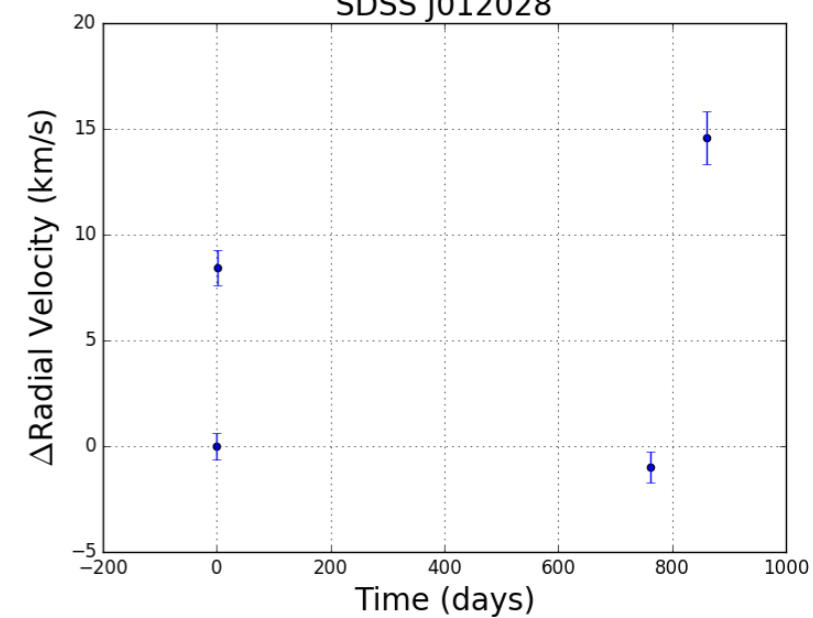
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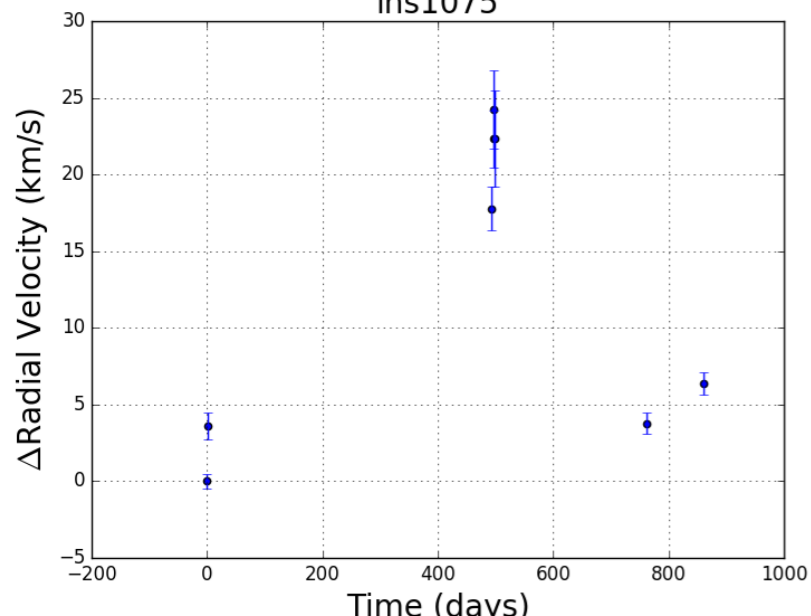


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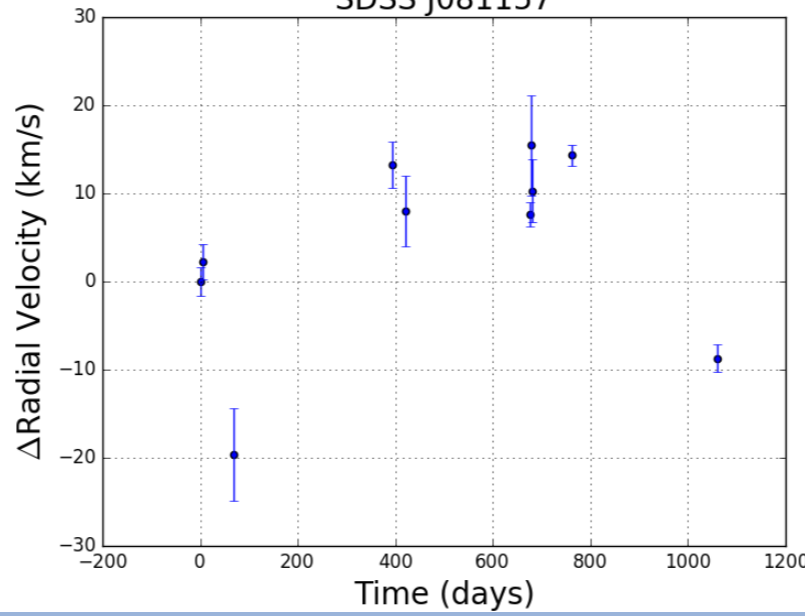


3T33 sample is consistent with a  
100% binary fraction

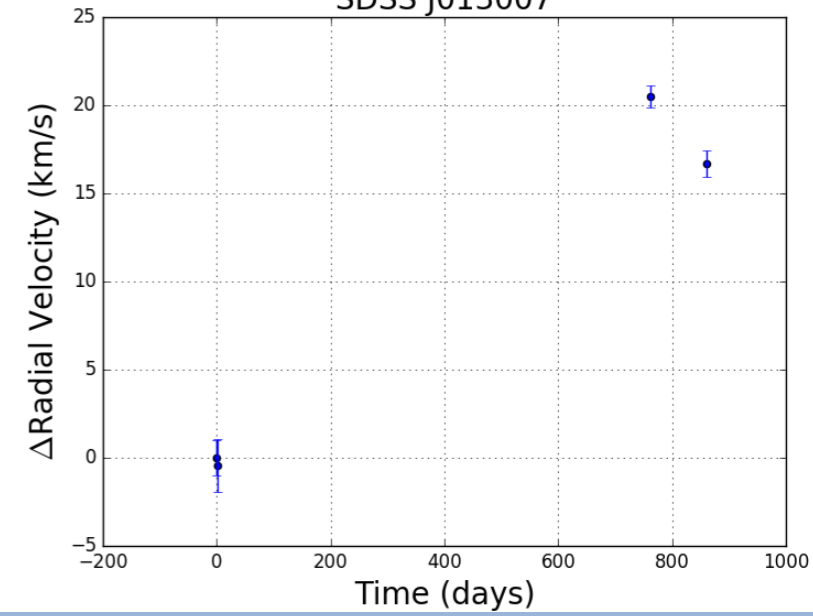
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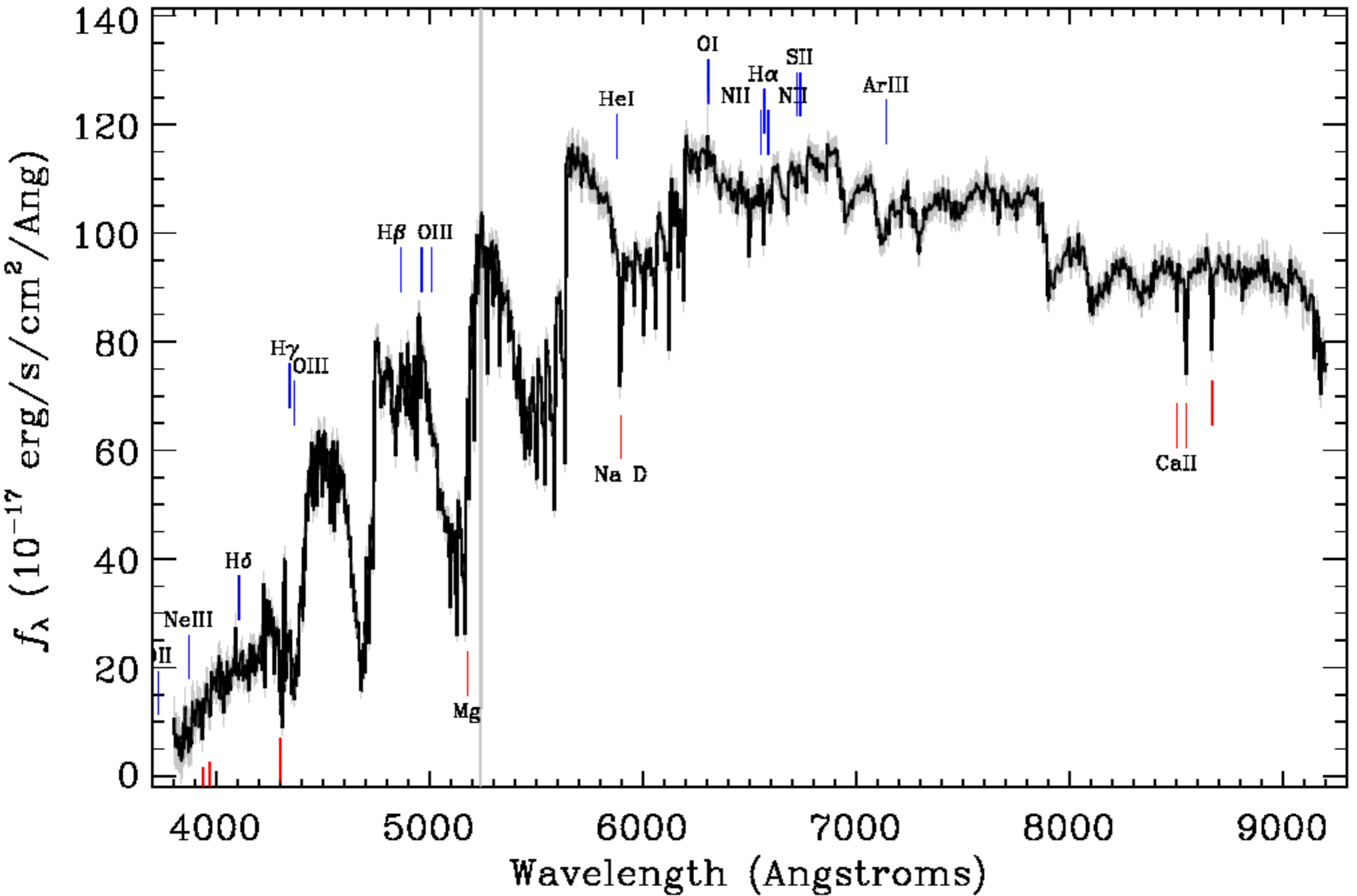
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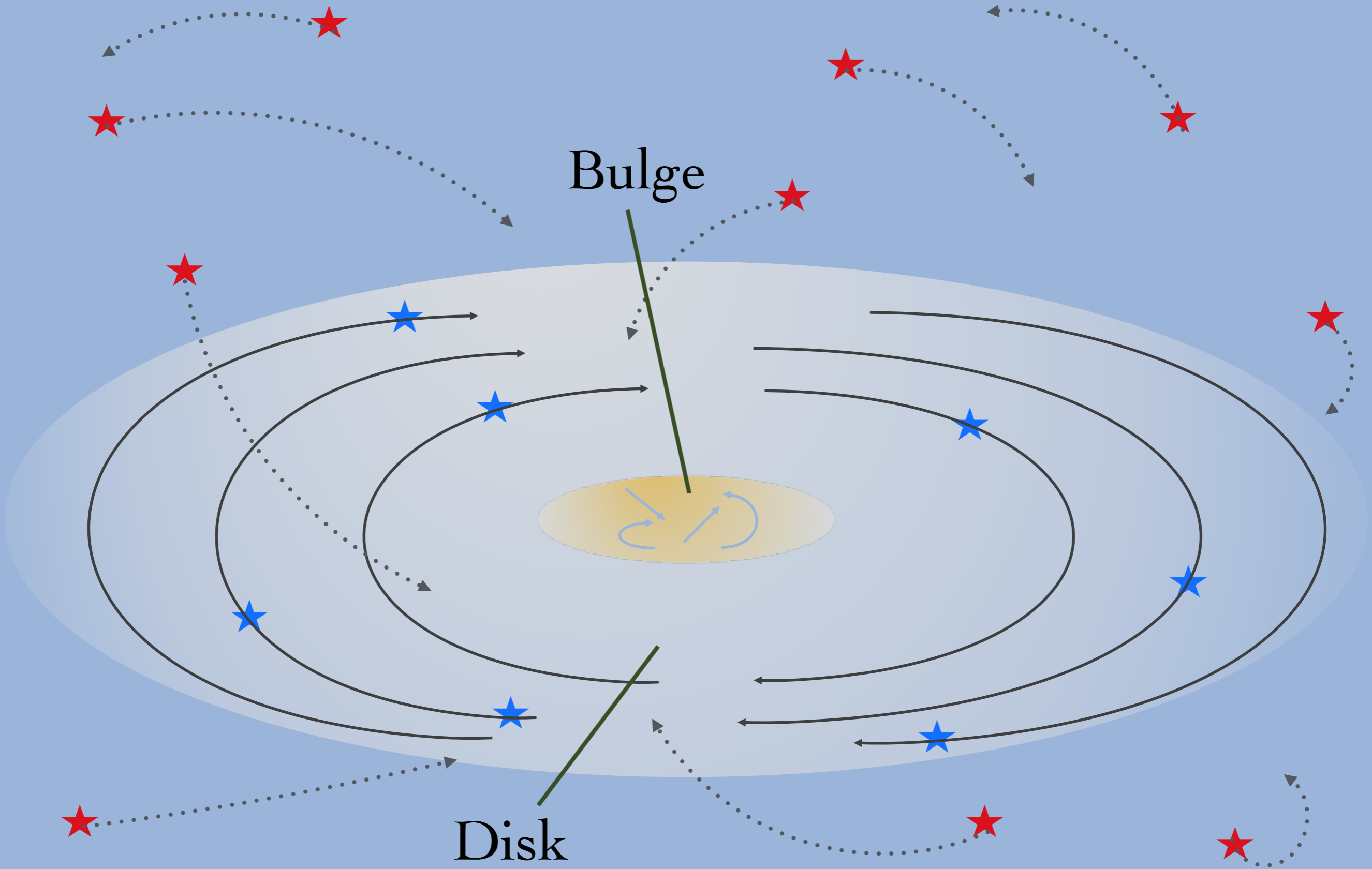
# dCarbon star spectrum





# Carbon Enhanced Metal-Poor stars

- Defined as stars with:  $[C/Fe] \geq +0.7$ ,  $[Fe/H] \leq -1.0$
- CEMP-s stars are polluted with slow neutron capture elements
- CEMP-s stars are also consistent with a 100% binary fraction
- Are dC stars the progenitors to CEMP-s stars?



dC stars show Halo  
Kinematics

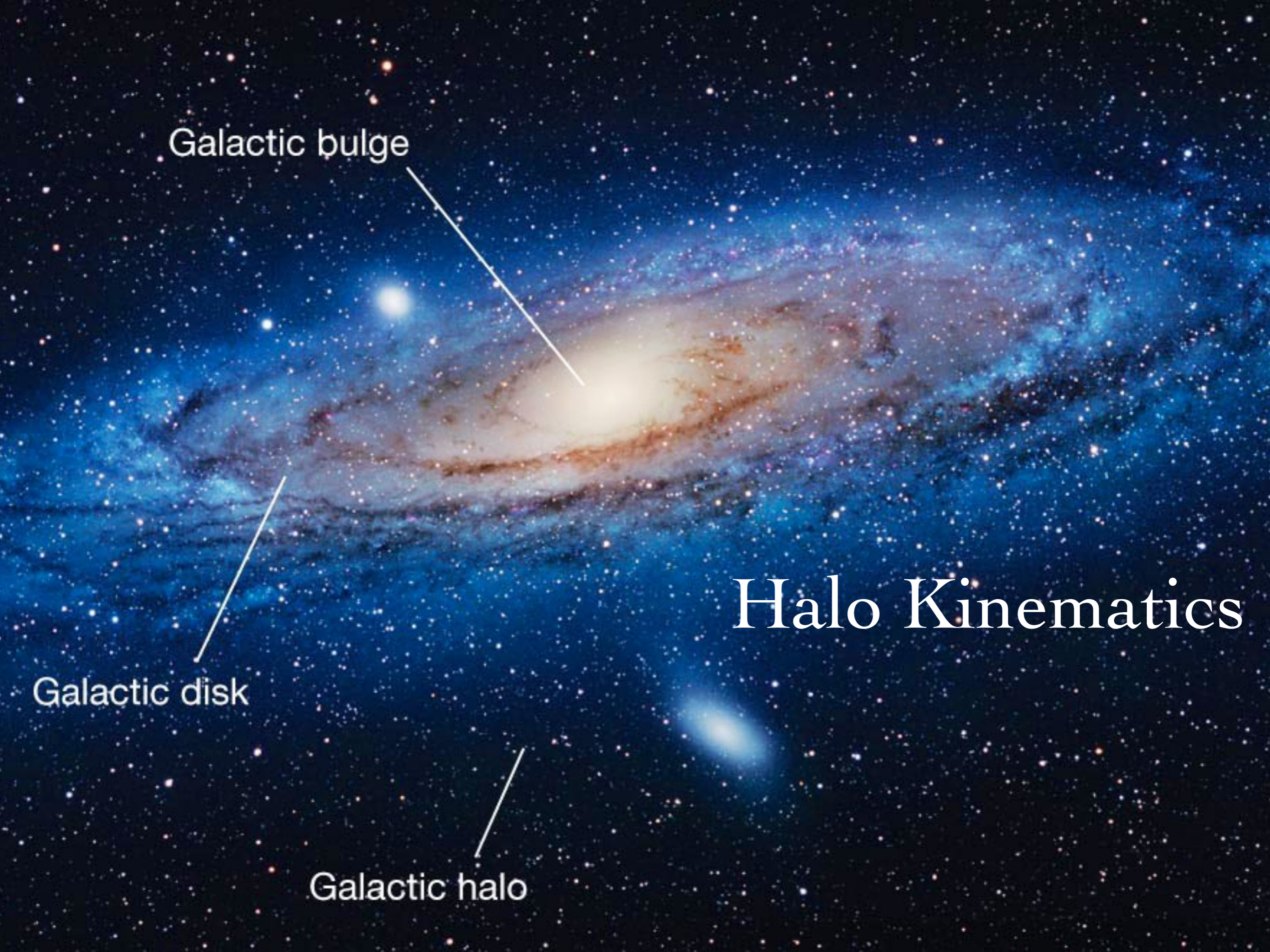
Halo

# Ongoing and future work

- Continue and complete the radial velocity survey
- Calculate the space velocities of dC stars
- Create *MARCS* models to measure abundances
- This can unlock secrets of the chemical history of the early *Milky Way*

# Take home points

- dC stars are low mass stars with  $C/O > 1$
- Our radial velocity survey is consistent with a 100% binary fraction
- dC stars are possibly the progenitors to (giant) CEMP-s stars



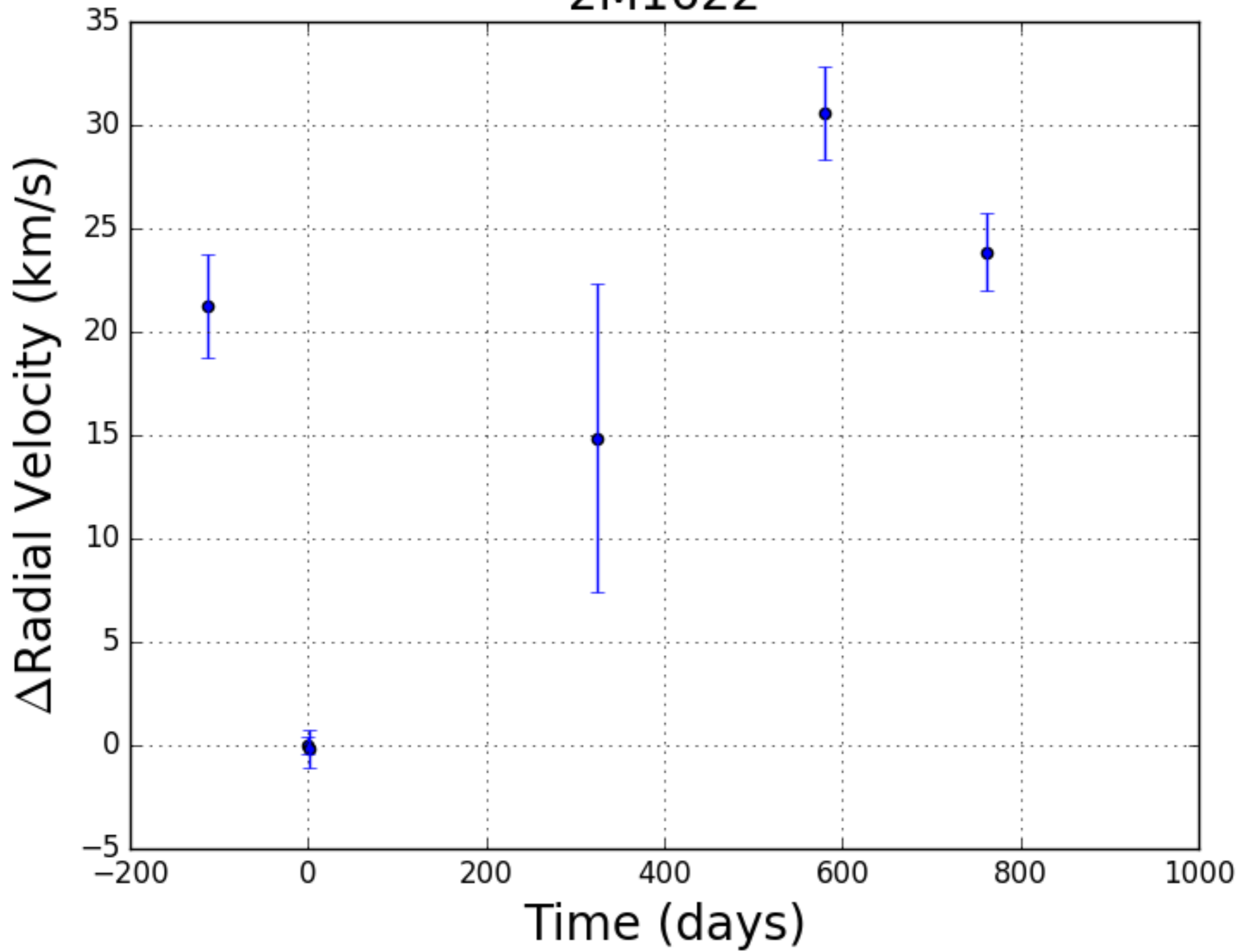
Galactic bulge

Galactic disk

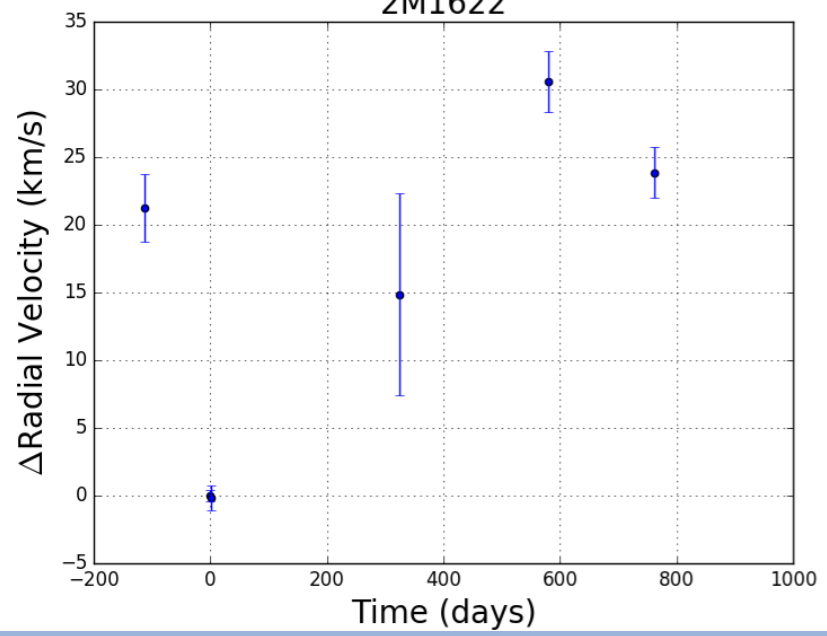
Galactic halo

# Halo Kinematics

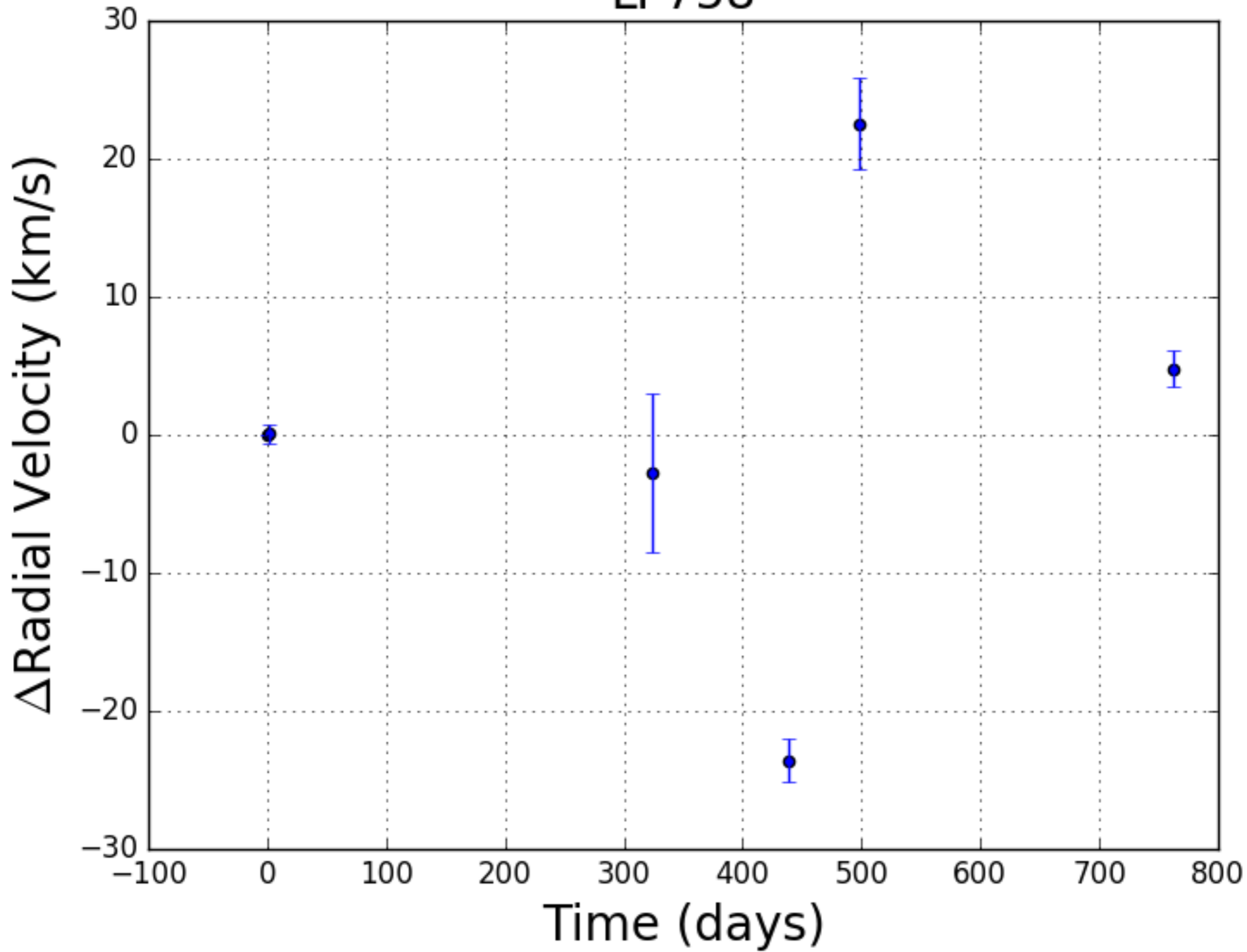
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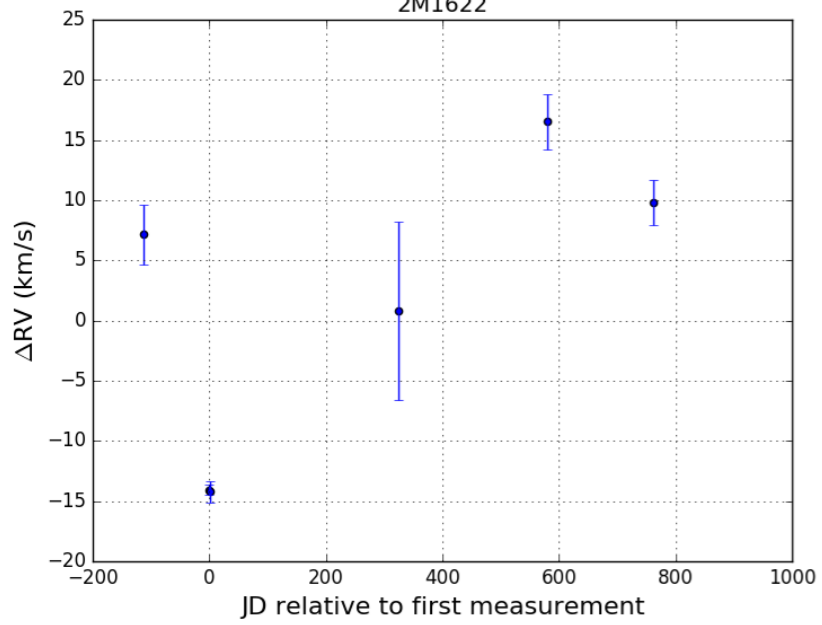


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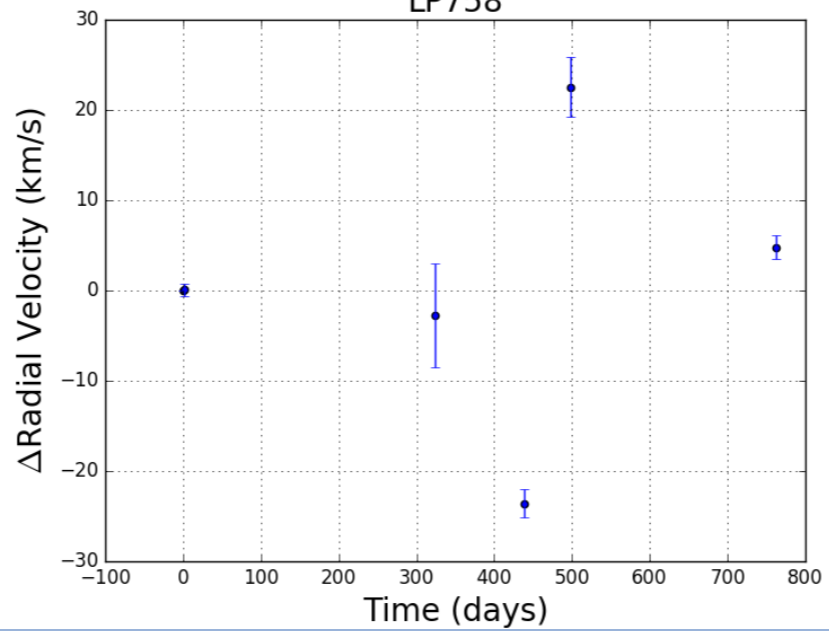




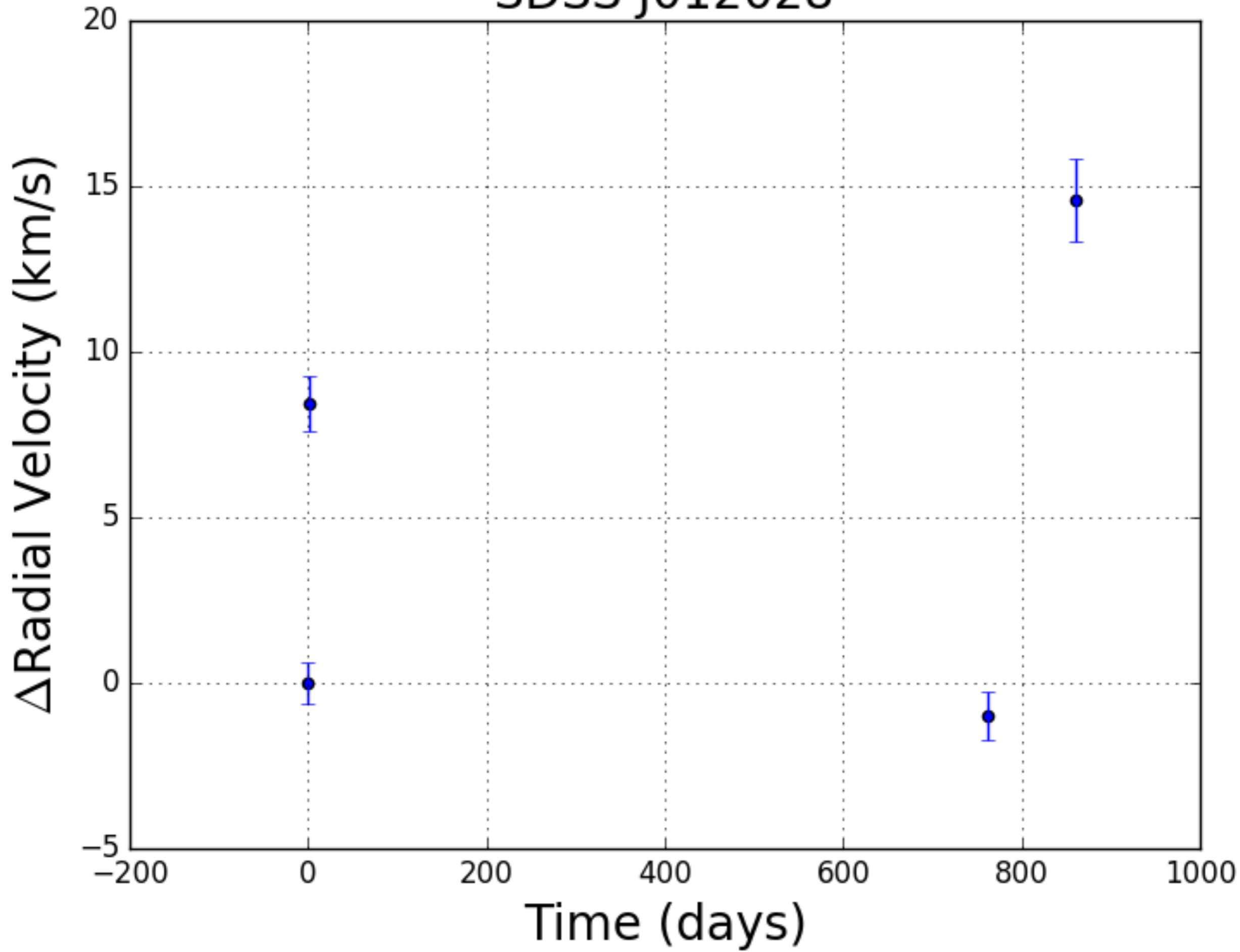
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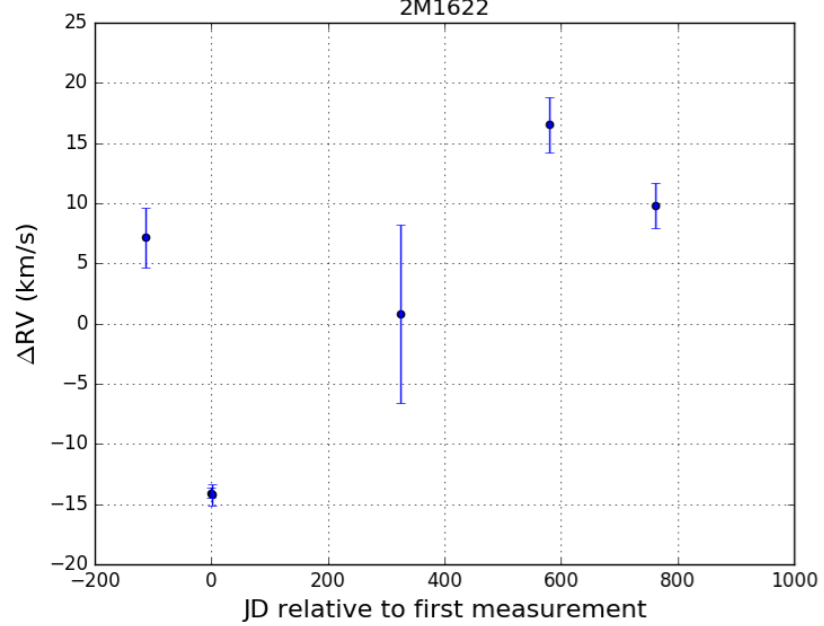
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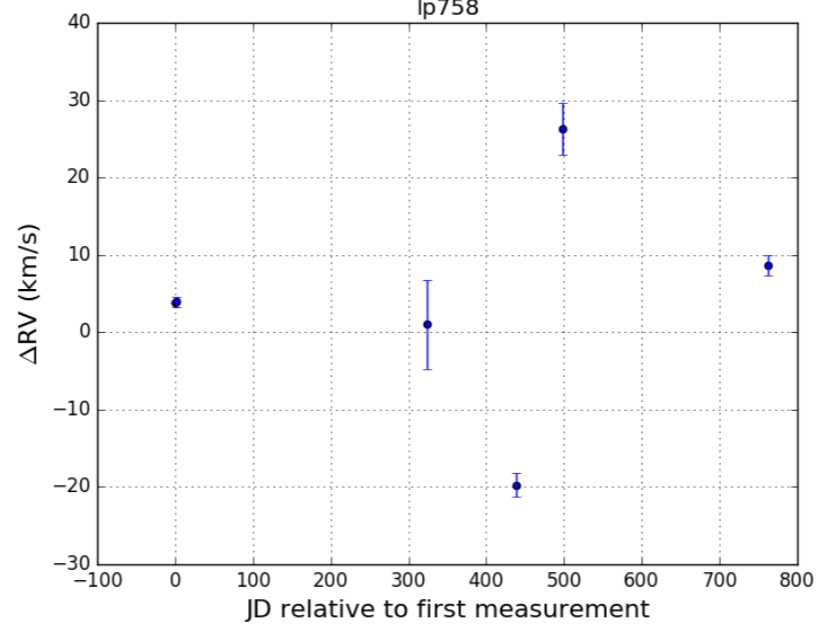
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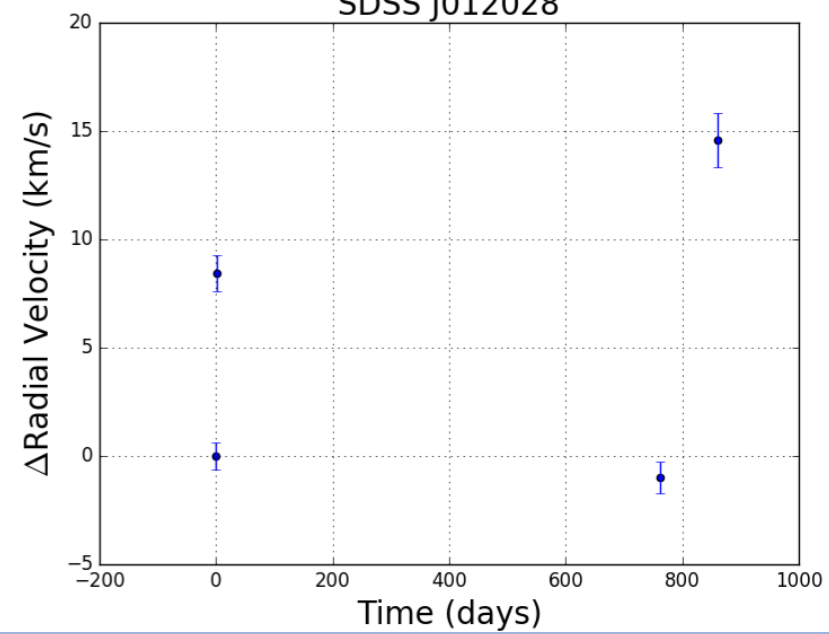
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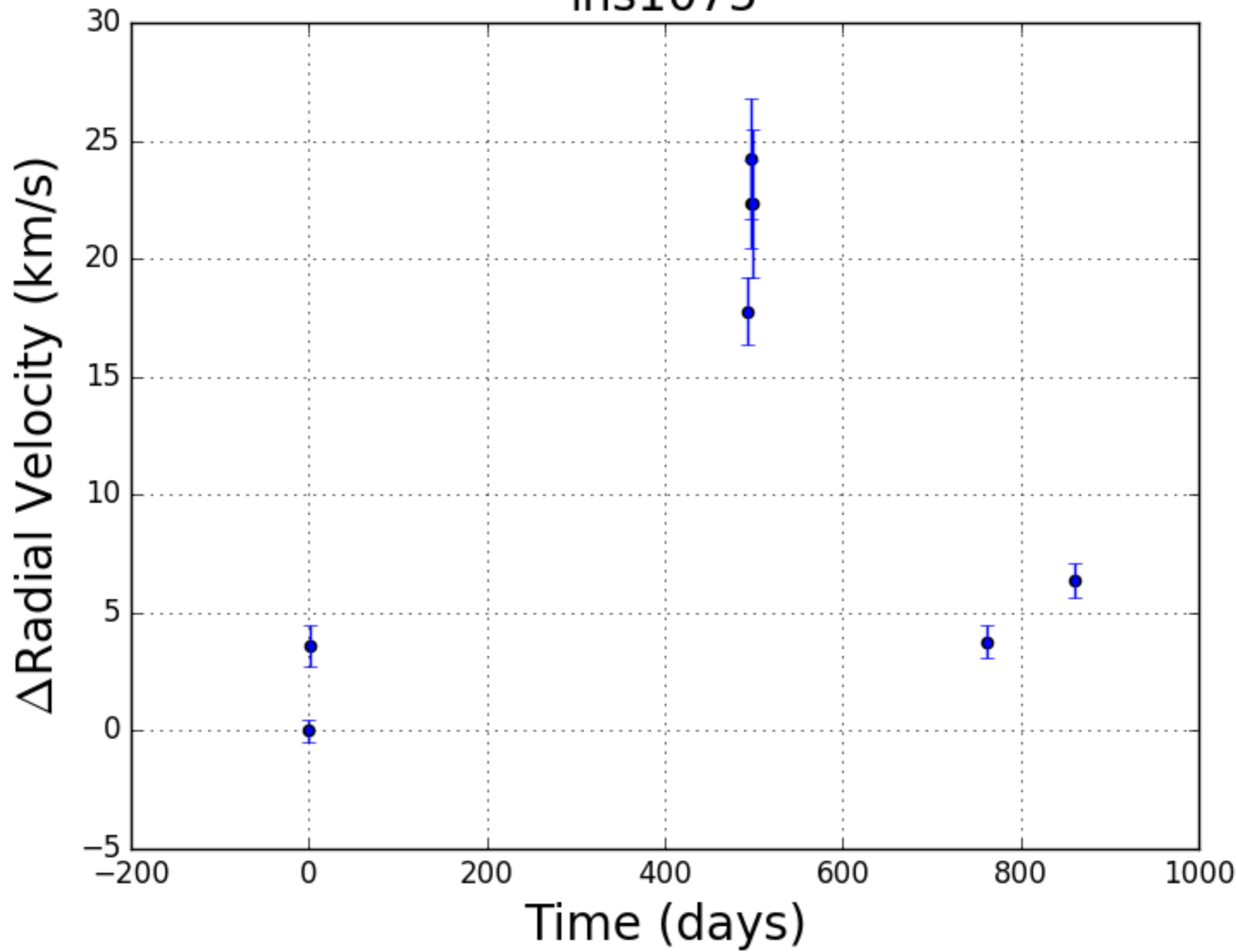
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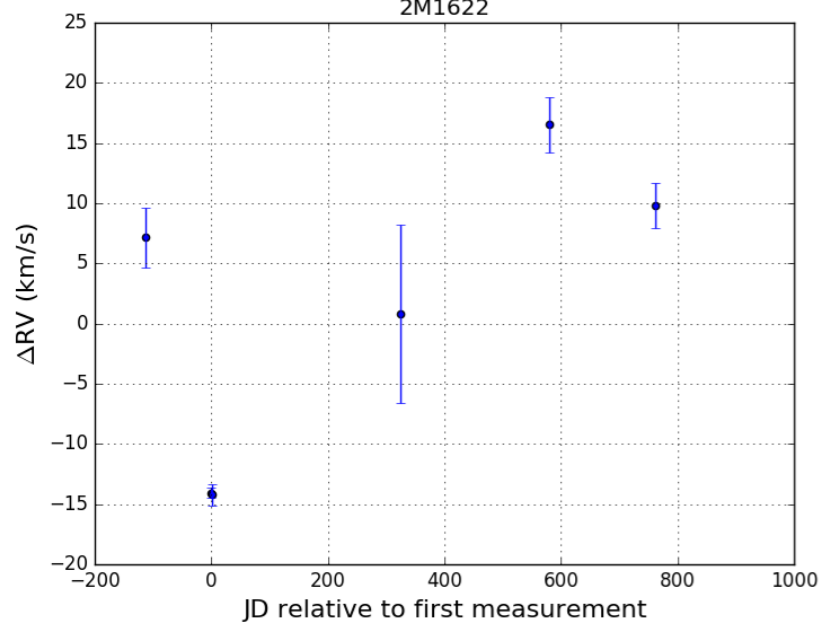
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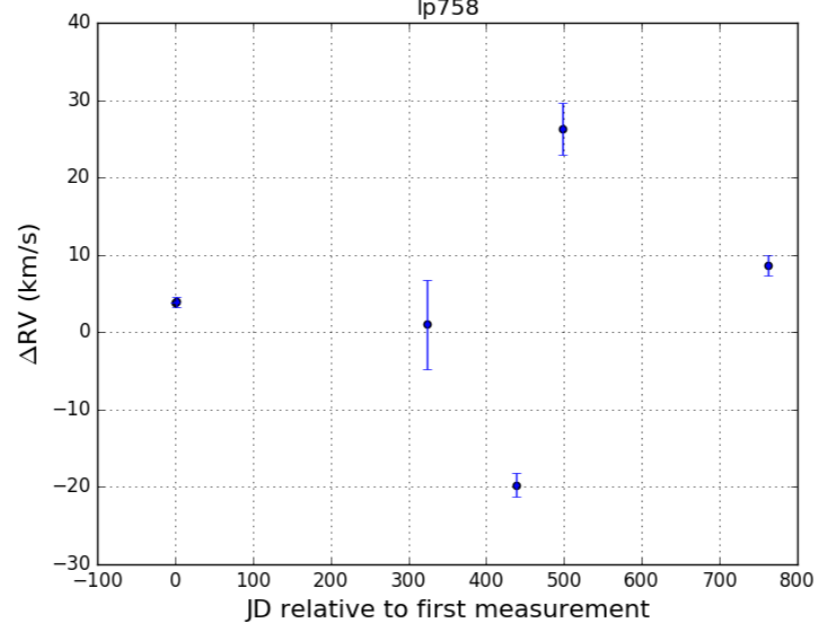
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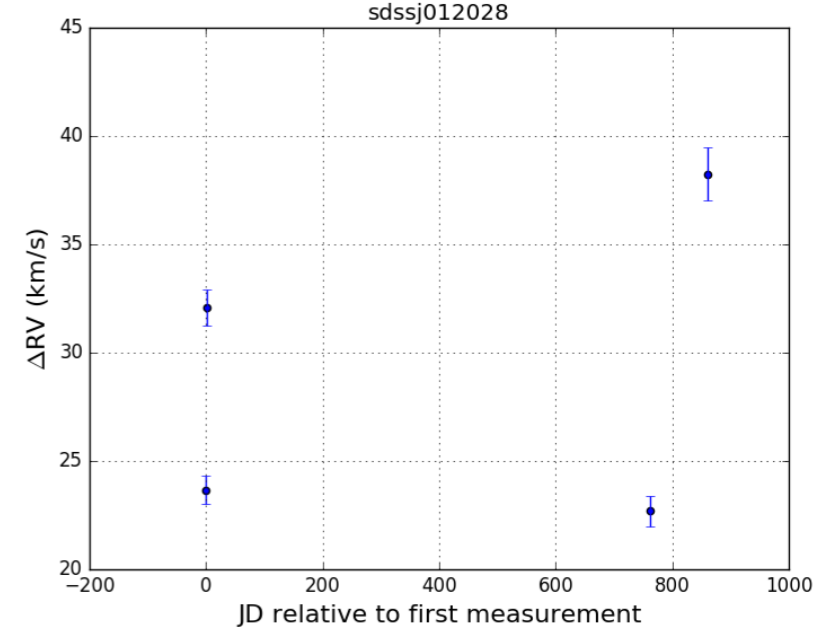
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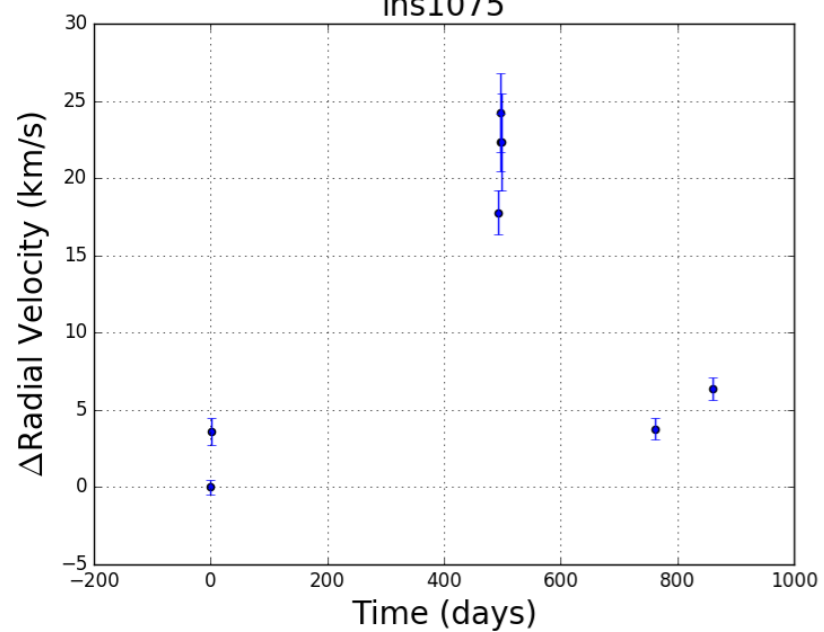
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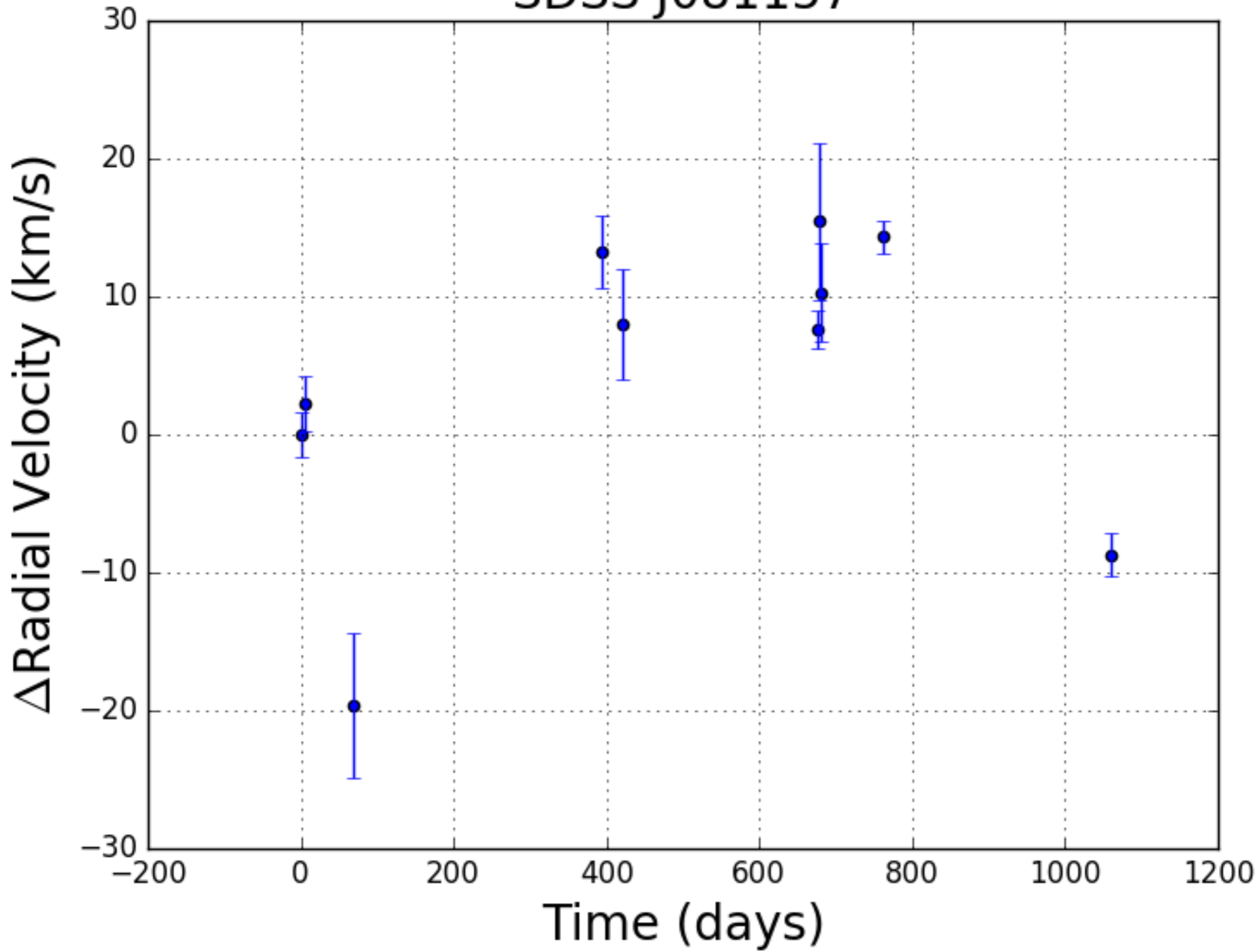
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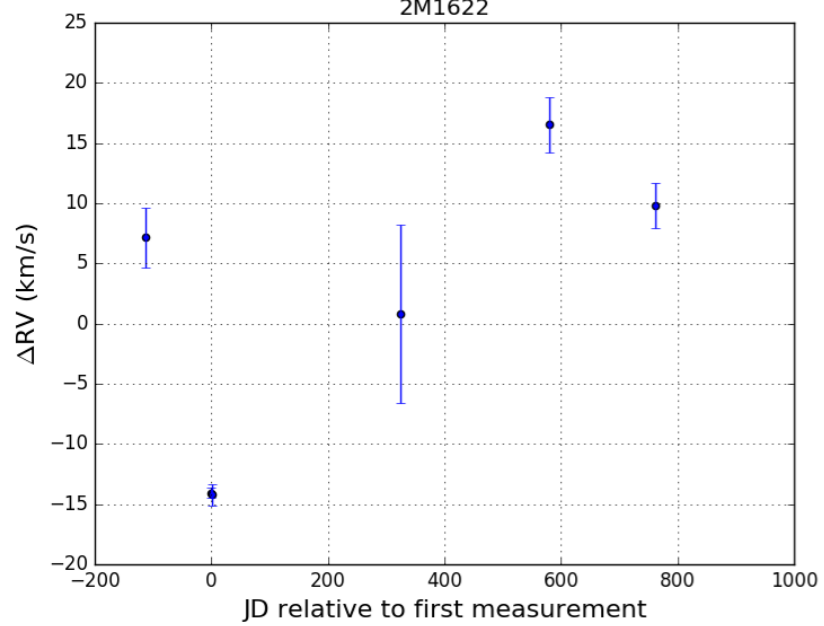
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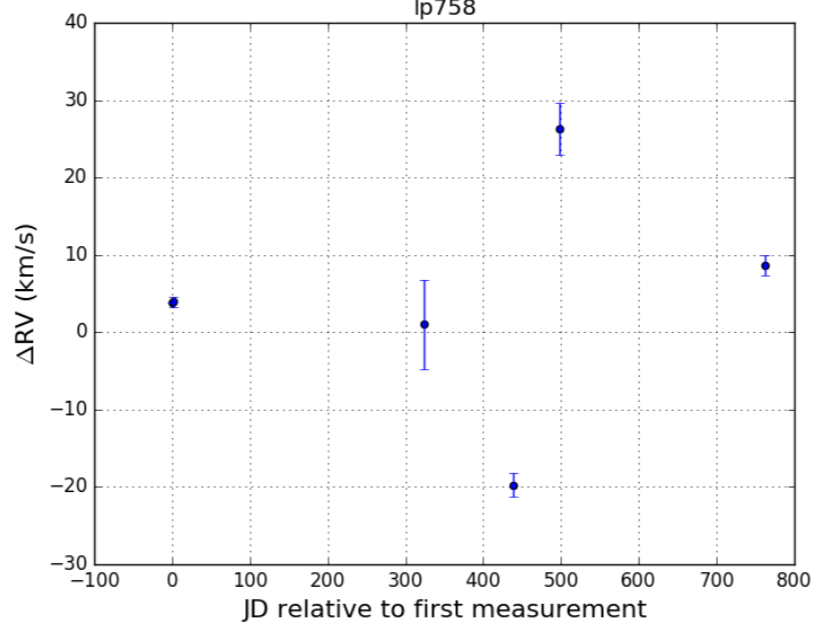
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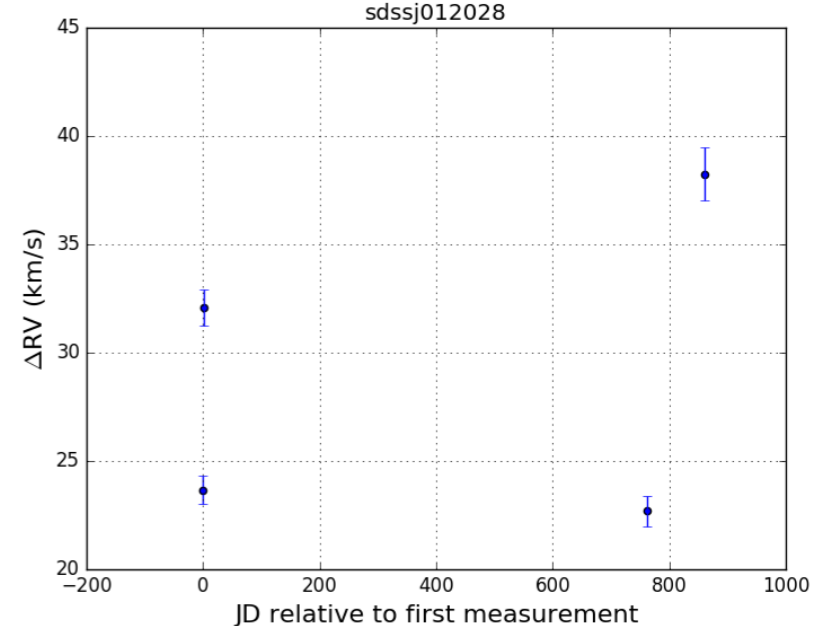
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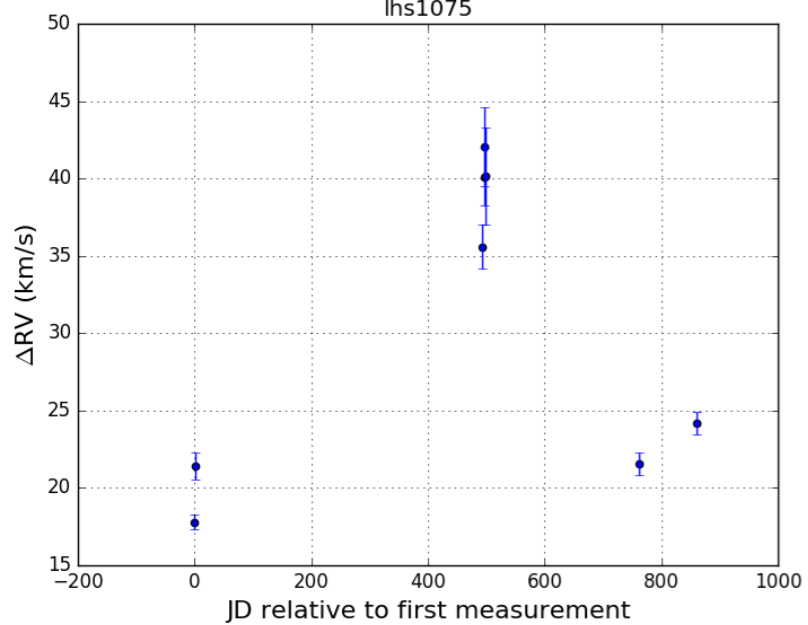
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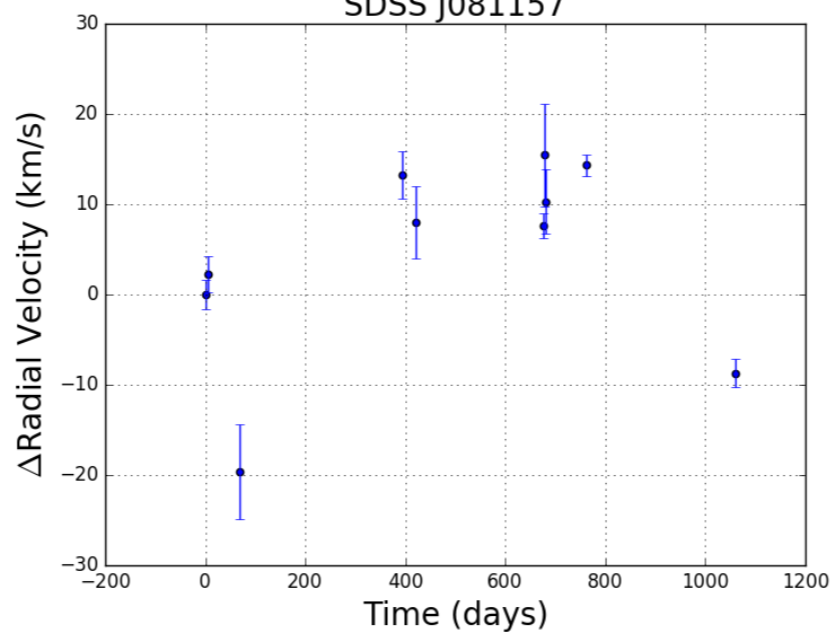
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lhs1075



SDSS J081157



# SDSS J013007

