Galactic Trajectories of Millisecond Pulsars

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Table of contents

Data

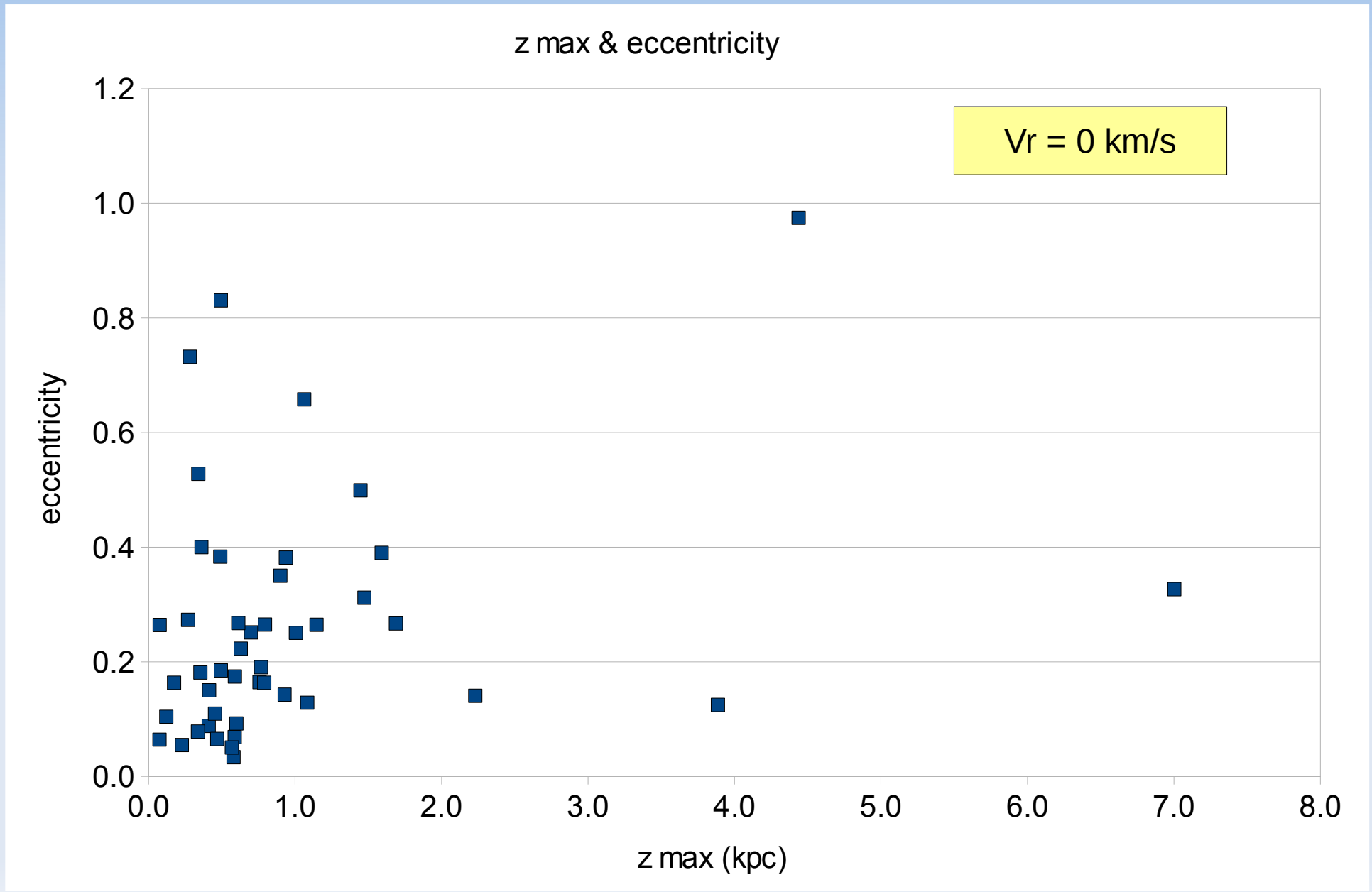
- Data from ATNF pulsar catalog
- Pulsar with $P < 100$ ms and $dP/dt < 10^{-14}$
- Proper motion measured
- Not in a globular cluster

  → 47 pulsars

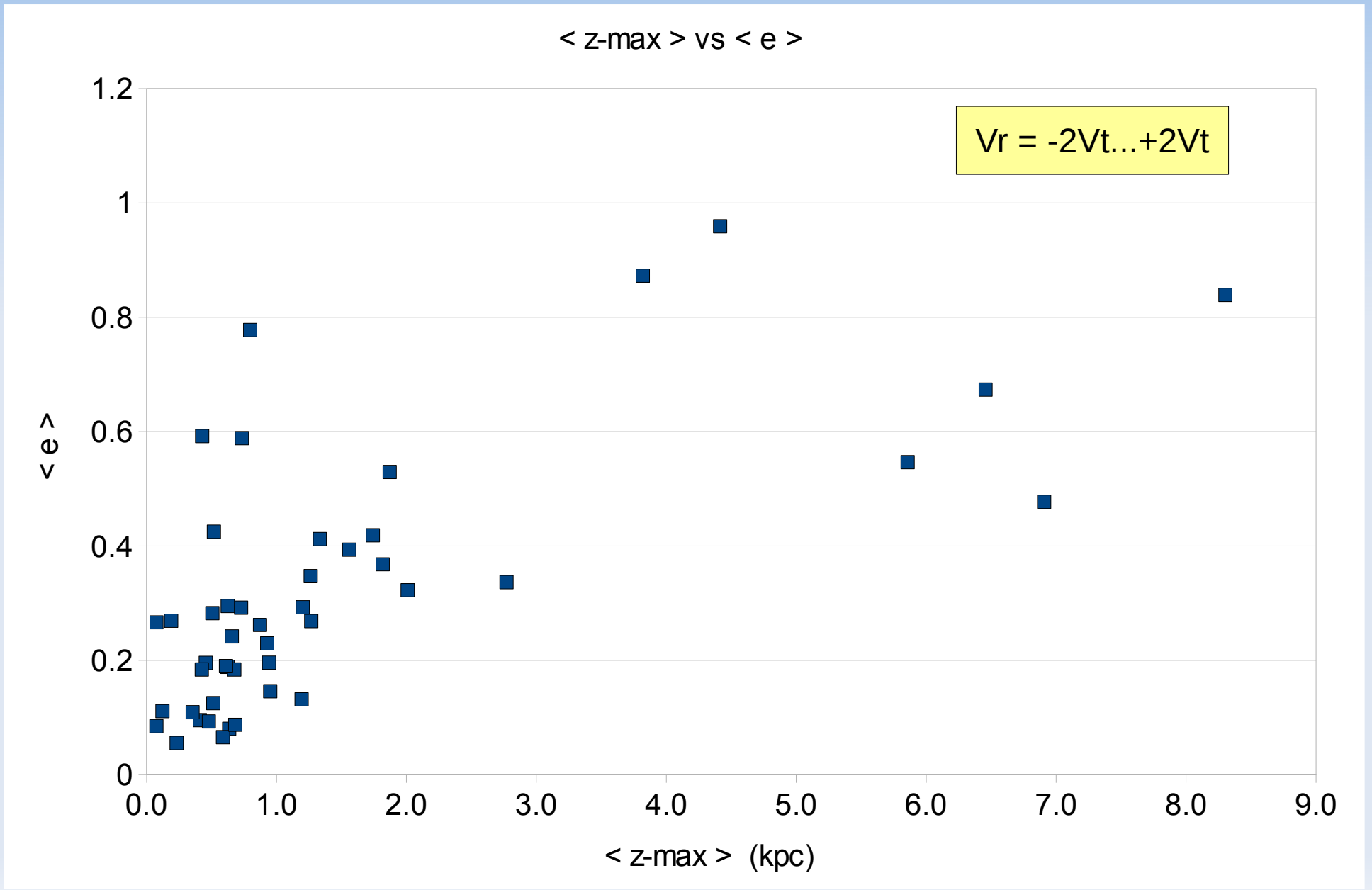
Method

- Galactic potential of Kuijken and Gilmore (1989)
- 4^{th} order Runge-Kutta method
- Analysis of orbits (extrema in R and Z, etc.)
  - Integration 1 Gyr back in time for Vr = 0 km/s
  - Integration 1 Gyr back in time for Vr range [-2Vt , 2Vt]

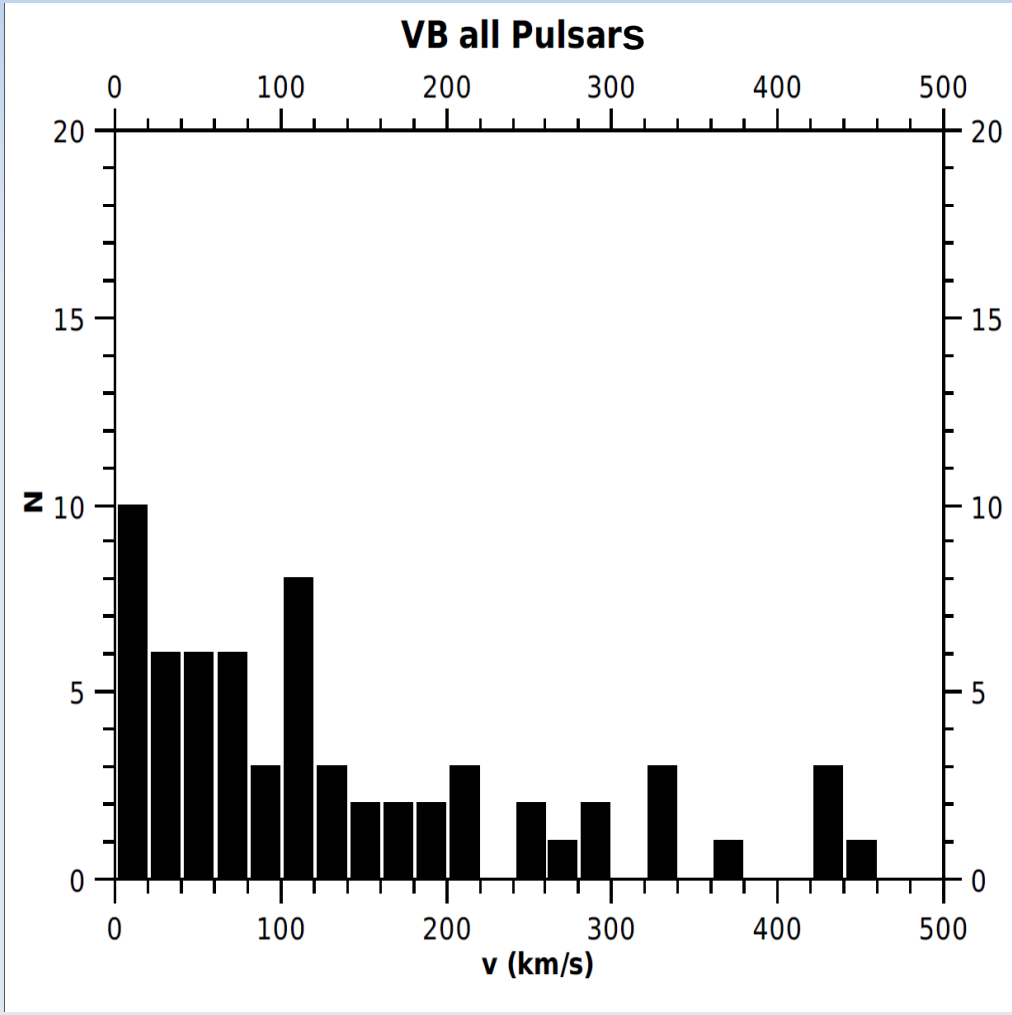
Maximum z and eccentricity

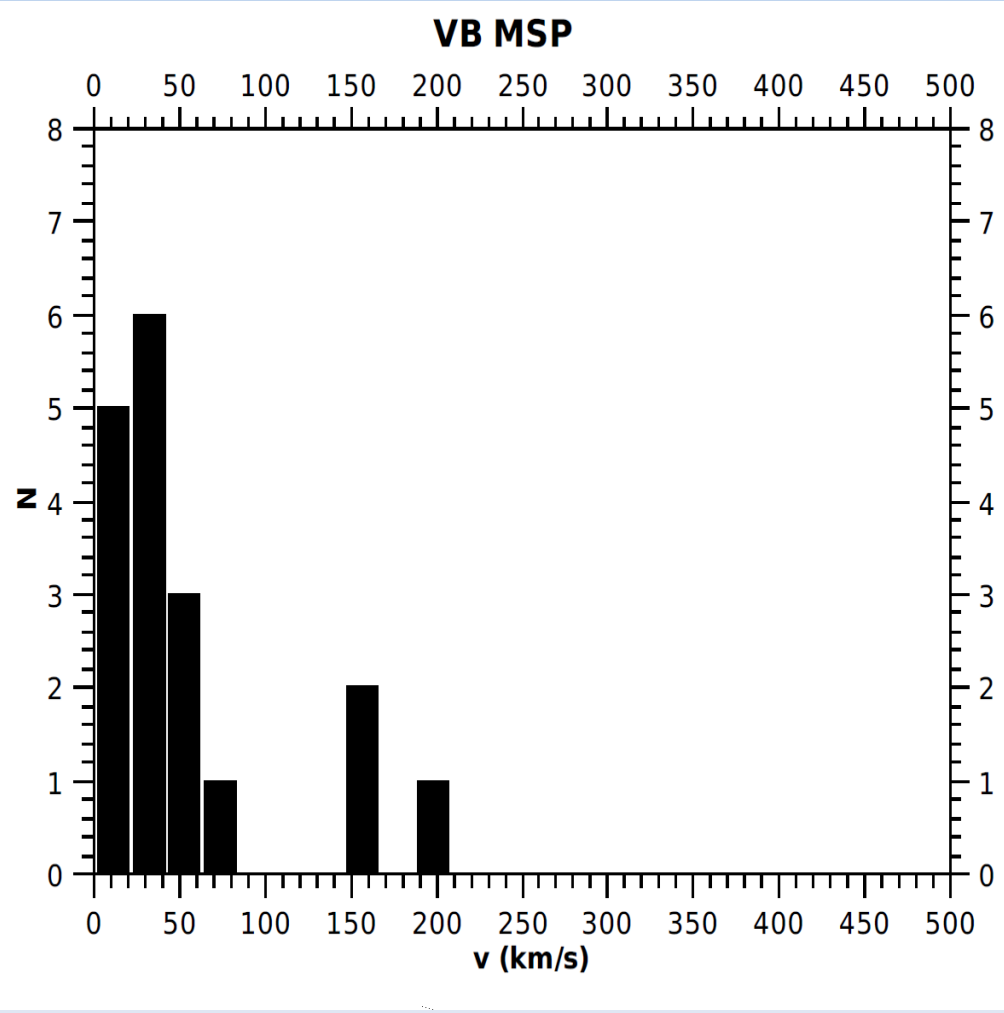


Averaged maximum z and eccentricity

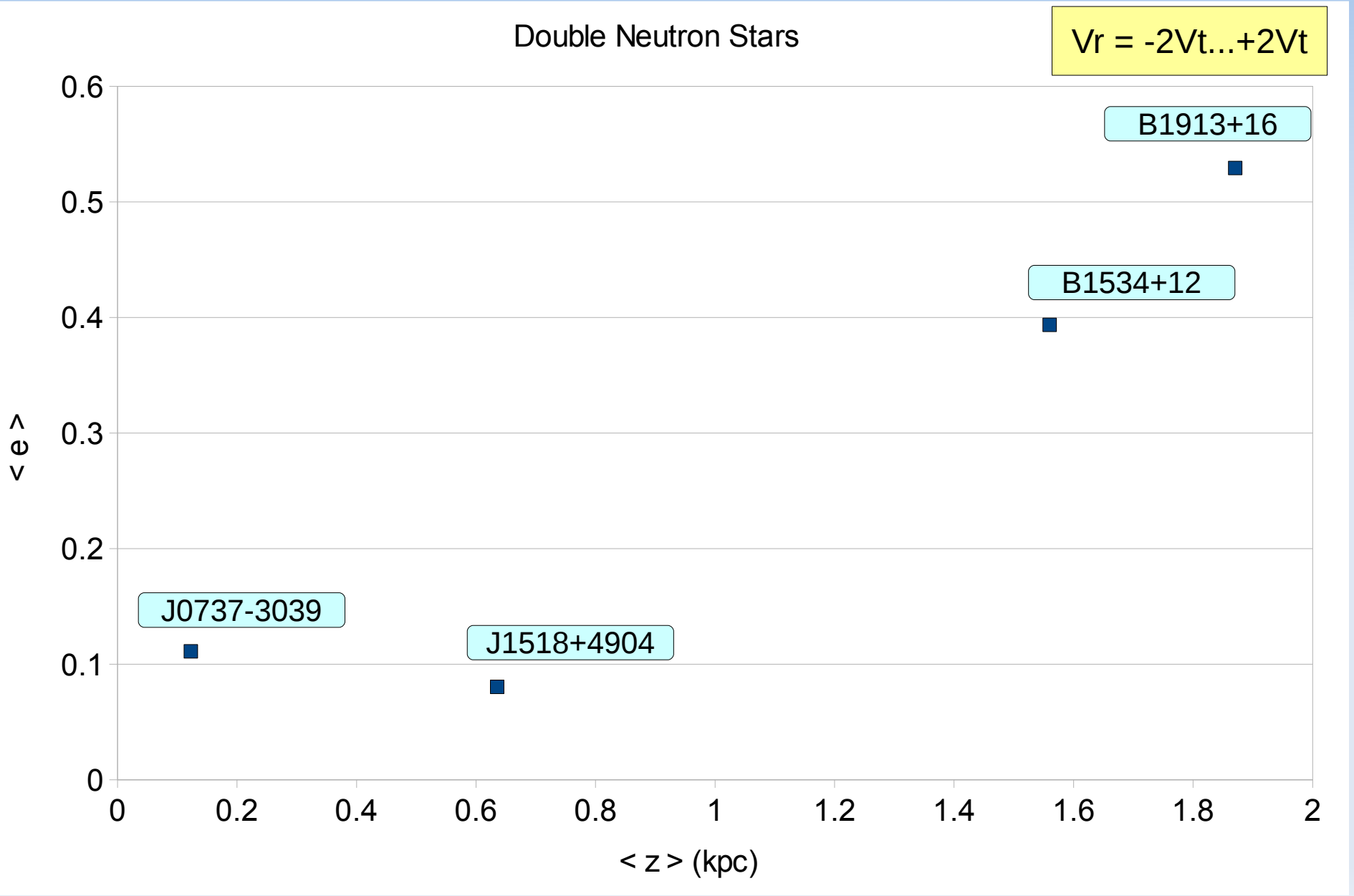


Comparison with all pulsars

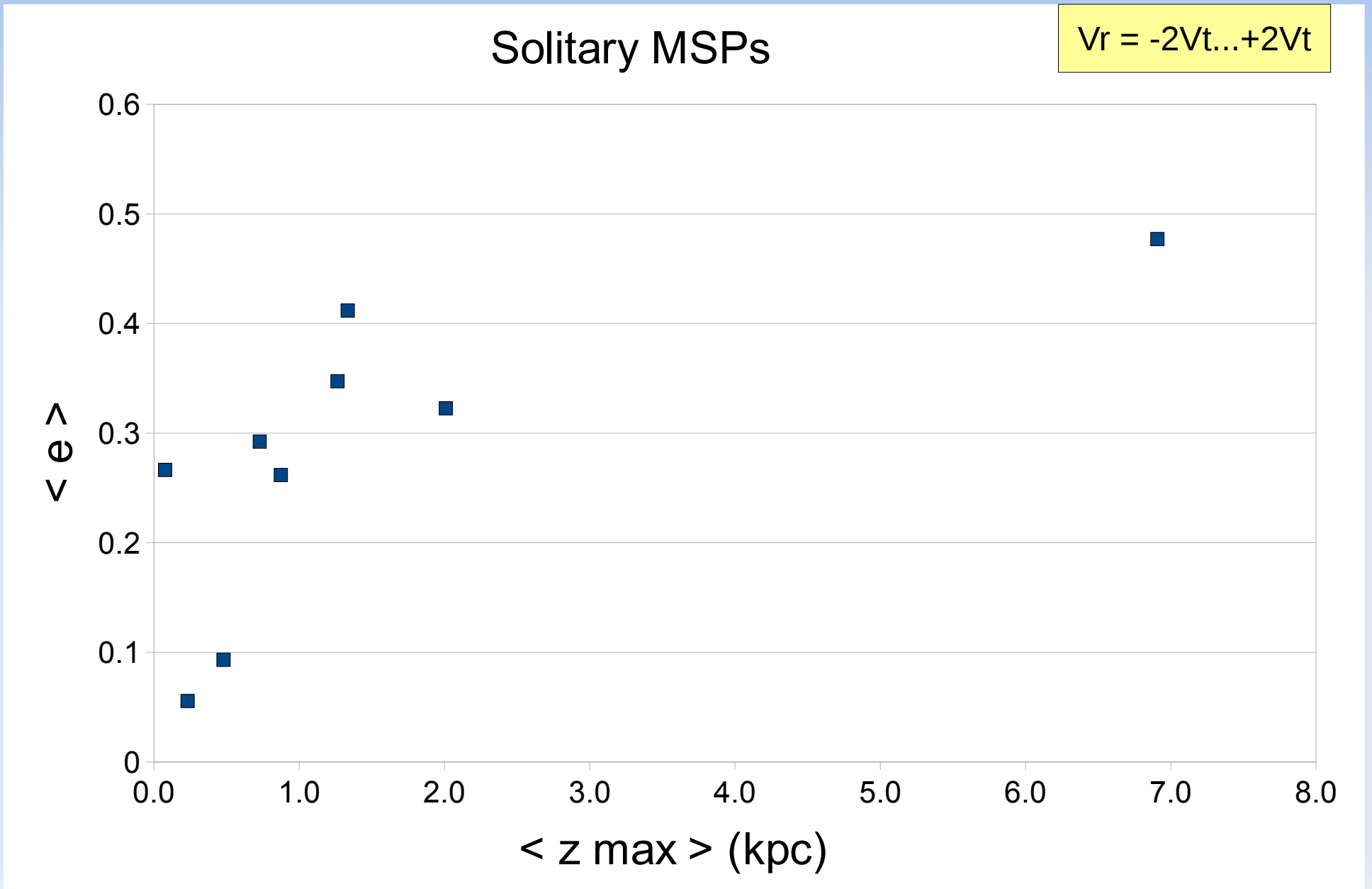




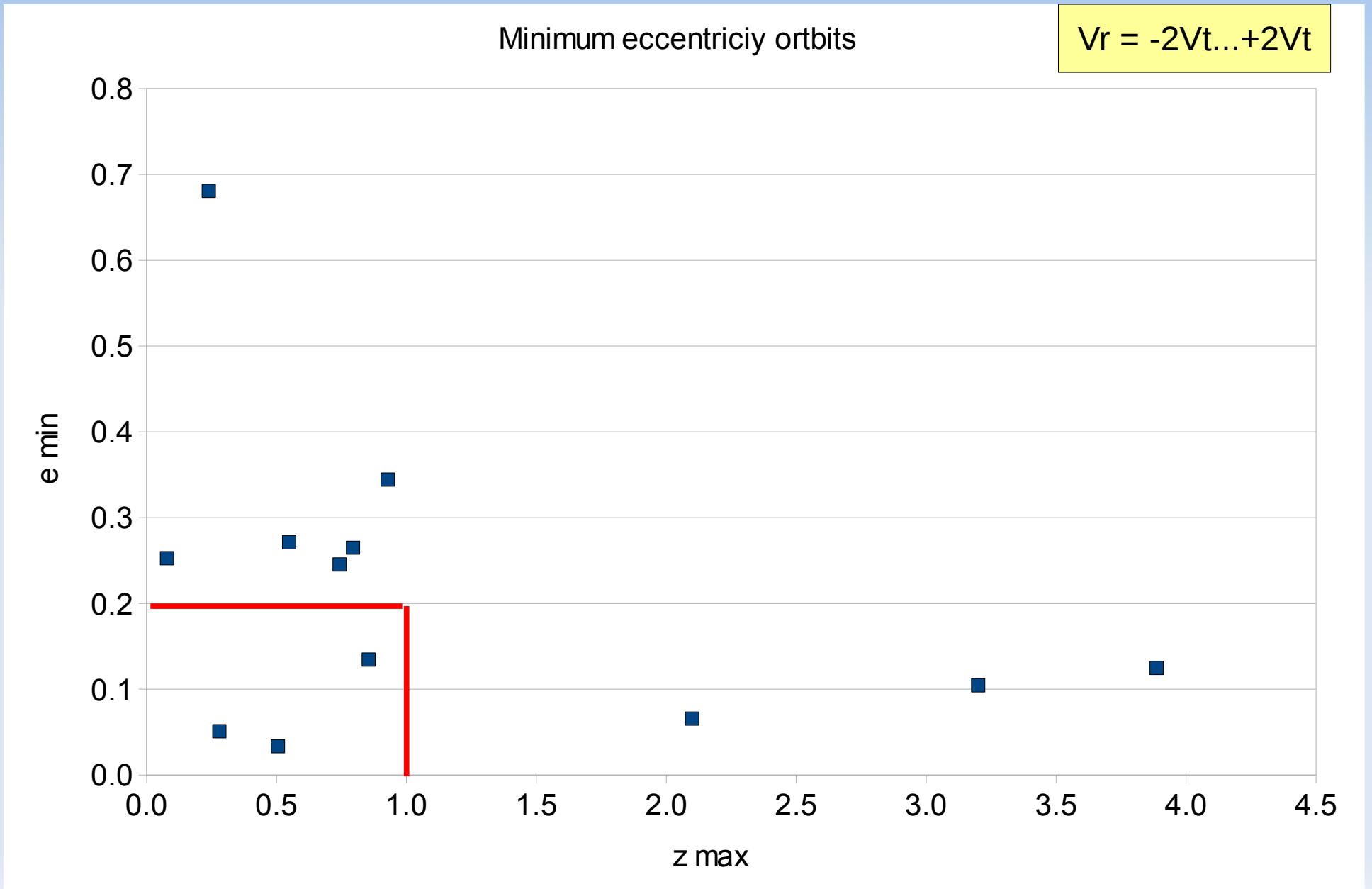
Double neutron star systems



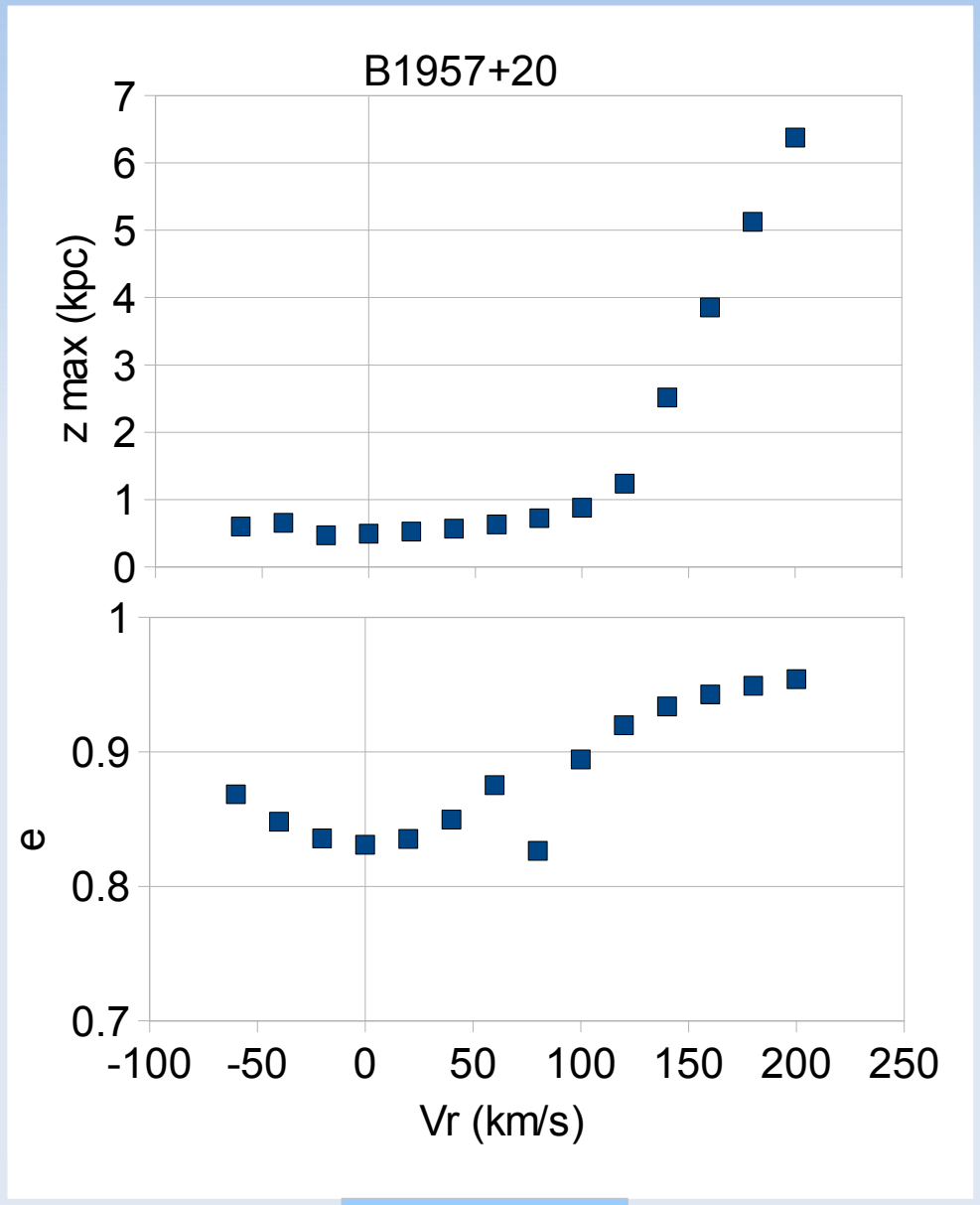
Solitary MSPs - I



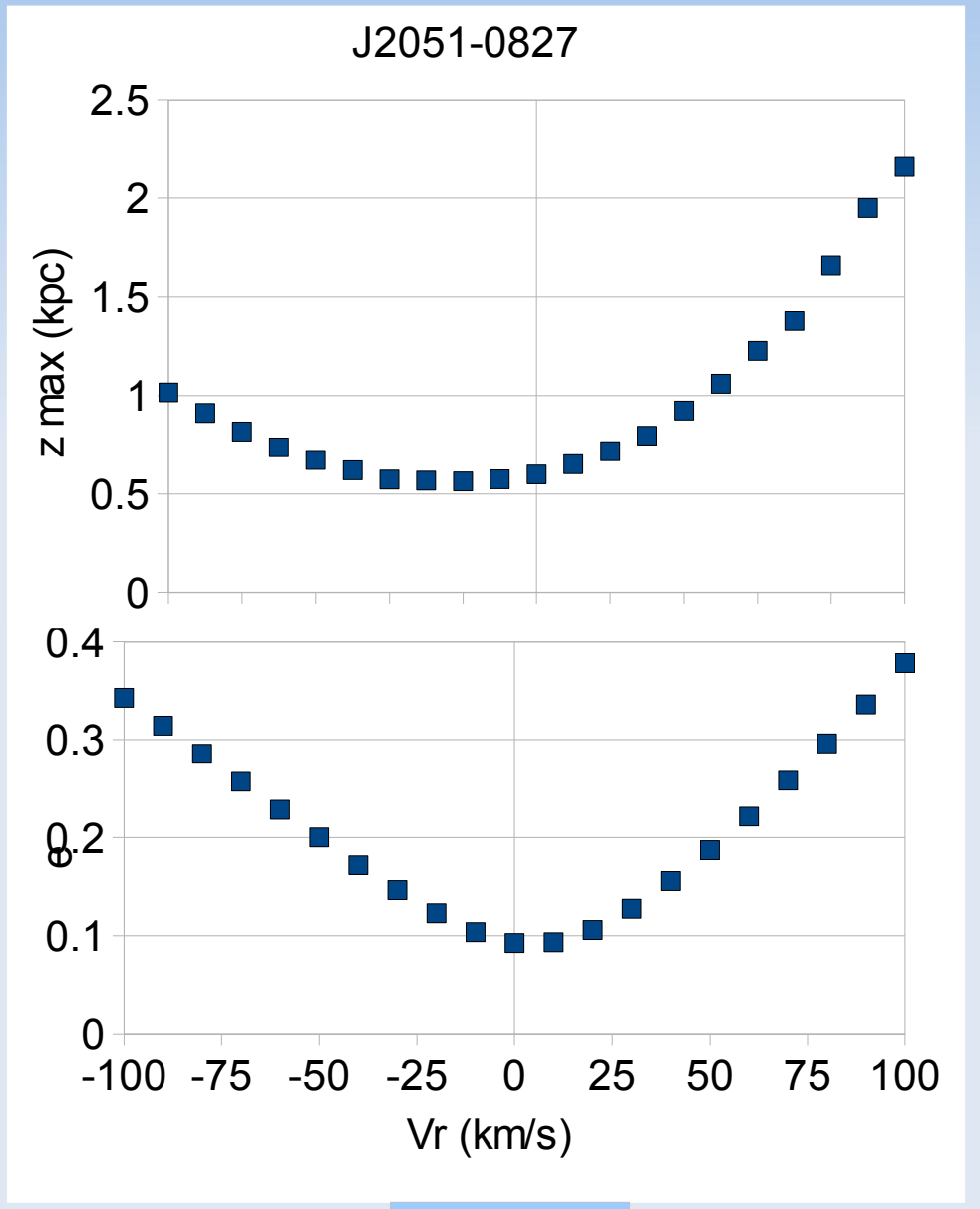
Solitary MSPs - II



Black widow pulsars



Vt = 320 km/s

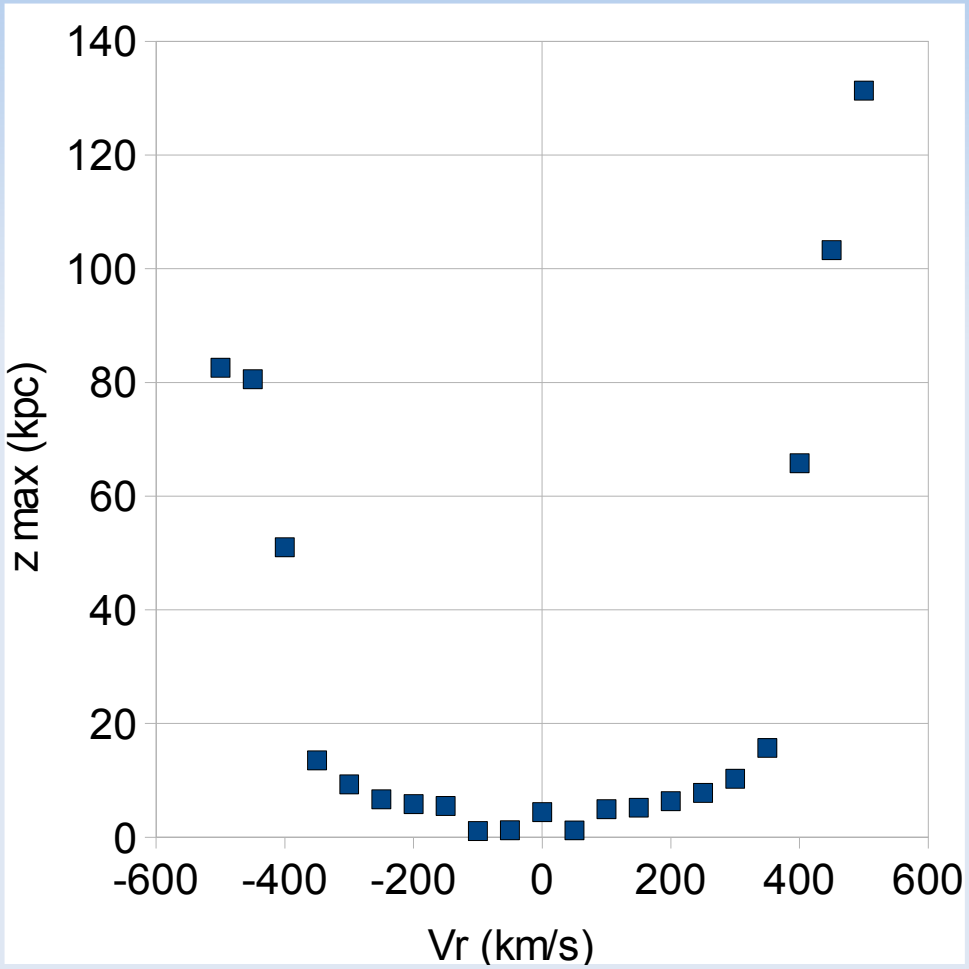


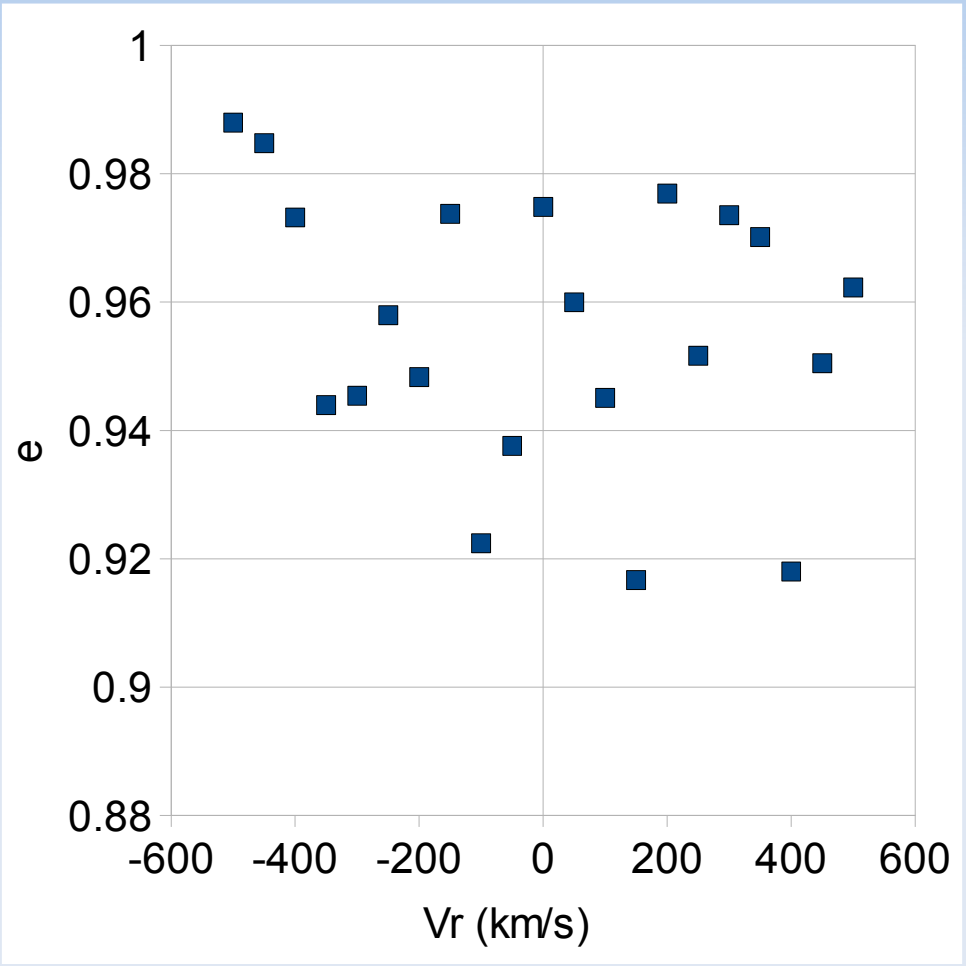
Vt = 26 km/s

PSR J1909-3744 - I

RAJ	19:09:47.4366120	
DECJ	-37:44:14.38013	
L	-0.27	
B	-19.60	
F0	339.32	
F1	-16.14819E-16	
PMRA	-9.51	0.007
PMDEC	-35.859	0.019
PX	0.79	0.04
Dist	1.27	
PB	1.53	
VL	-222.56	
VB	-18.74	

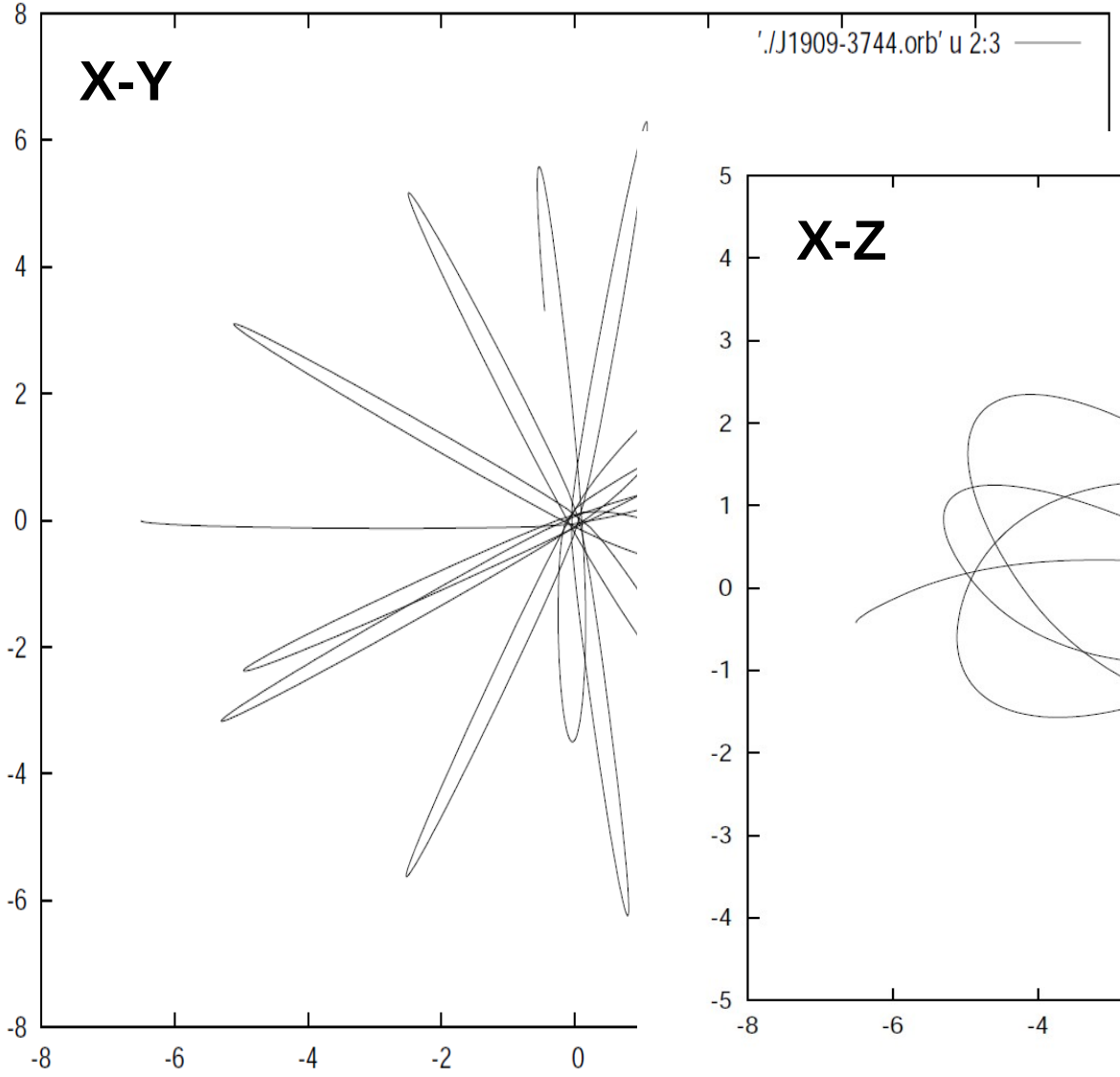
PSR J1909-3744 - II

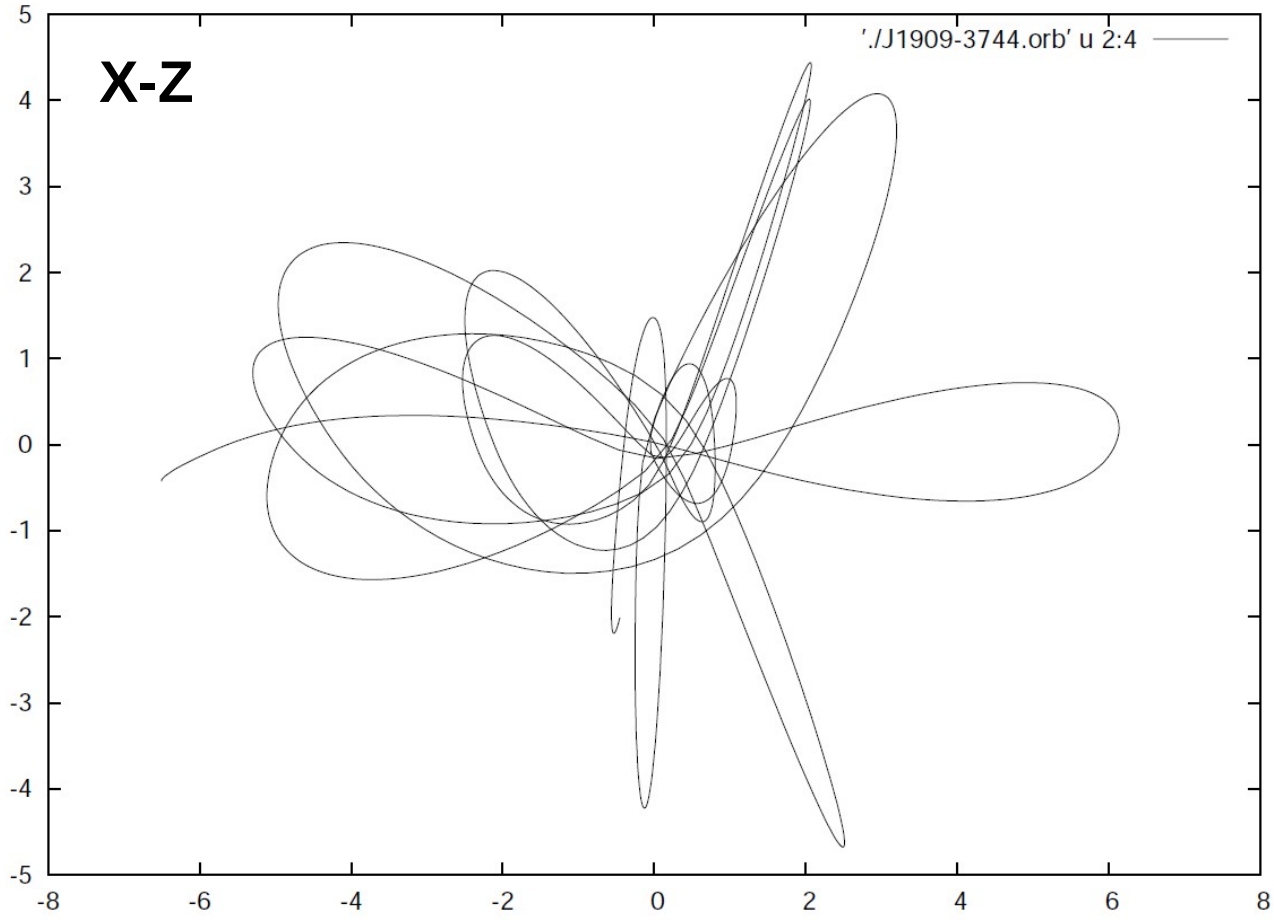




PSR J1909-3744 - III

Vr = 0 km/s





PSR J1909-3744 - IV