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The effect of tidal shocks onto the internal structure of globular clusters

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ABSTRACT

Key words: methods: numerical – galaxies: formation – galaxies: star clusters: general.

1 TOREAD

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2 INTRODUCTION

Webb et al. (2018) study the effect of a tidal

A similar study was conducted three decades ago, although the scope was tidal disruption of galaxies rather than of globular clusters. (Aguilar & White 1985, 1986)

How clusters are affected by tidal shocks: (Spitzer 1958) (Spitzer 1987) (Gieles et al. 2006) (Kruijssen et al. 2011) (Gieles & Renaud 2016)

"By defining a tidal heating parameter (Gnedin 2003), cluster's mass loss history can be estimated for any known tidal history."

`https://arxiv.org/pdf/1911.01548.pdf` "If the dynamical evolution timescale is larger than the orbital period, these stripped stars remain for some time on approximately the mean orbit of the progenitor (Lynden-Bell & Lynden-Bell 1995)"

3 SIMULATIONS

NBODY6 (Aarseth 2003, 2010) NBODY6TT (Renaud et al. 2011; Renaud 2015; Renaud & Gieles 2015)

"Mode A: the tidal information is extracted from a galaxy or cosmology simulation, in the form of tidal tensors, along one orbit. This method is described in (Renaud et al. 2011)"

"Mode B: the user defines a numerical function which takes position and time as arguments, and returns the galactic potential. This method is described in (Renaud & Gieles 2015)"

- nbody6tt: Tidal tensors in N-body simulations (Renaud 2015)

Initial cluster density: King (1966) model with $W_0 = \{5, 7\}$ or (Plummer 1911) profile.

ICs with McLuster (Kuepper et al. 2011; Küpper et al. 2011)

GALPY (Bovy 2015) GALPY.POTENTIAL.TTENSOR and GALPY.POTENTIAL.RTIDE (Webb et al. 2019b) GALPY.POTENTIAL.TO_AMUSE (Webb et al. 2019a)

MWPotential2014 (Bovy 2015)

4 RESULTS

5 DISCUSSION

6 CONCLUSIONS

The last numbered section should briefly summarise what has been done, and describe the final conclusions which the authors draw from their work.

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The research was conducted using the Python (van Rossum & de Boer 1991) programming language with the IPython (Perez & Granger 2007) environment. We used the NumPy (van der Walt et al. 2011), SciPy (Virtanen et al. 2020), GALPY[1] (Bovy 2015), Astropy[2] (Astropy Collaboration et al. 2013, 2018), Astroquery (Ginsburg et al. 2019), EMCEE (Foreman-Mackey et al. 2013), and CORNER (Foreman-Mackey 2016) packages. Furthermore, we use the AMUSE (Portegies Zwart et al. 2009, 2013; Pelupessy et al. 2013; Portegies Zwart & McMillan 2018) framework. Plots were generated using Matplotlib (Hunter 2007).

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[1] https://github.com/jobovy/galpy
[2] https://www.astropy.org

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