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Backward and forward orbital integration of the Milky Way globular cluster system. (12+3)

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Thanks to the last years great success of the European Space Agency space mission GAIA and the latest data release of the 3D stellar positions and velocities in our Galaxy we now have a very accurate and homogenous data for the Milky Way Globular Cluster (GC) system space positions and velocities up to 200 kpc of Galactocentric distances. Based of the GC system current coordinates and velocities from the combined mixed catalogues of Baumgardt 2019 and Vasiliev 2019
we perform the full orbital calculations of 152 GC's in our Galaxy combined gravitational potential. For the Milky Way potential, we use one of the recent combined Bulge + Disk + Halo model Bajkova & Bobylev 2020. For the cluster's
orbital integration, we use our high order parallel dynamical N-body code phi-GPU CUDA (Berczik at al. 2011). Using this external potential, we first integrate the GC systems up to 5 Gyr back in time (reverse integration set) and after check the integration results with the forward integration set. Using these orbital data set we check the "collisions"conditions of GC's. In the second part of our work we check in details these potential "collisions"again using our phi-GPU CUDA N-body integration code. As a main result of our simulations we determine the mass exchange rate (for a last few Gyrs) between the individual GC's and also examine the possible rotation angular momentum exchange rate between the clusters.

References:

Baumgardt, 2019 https://people.smp.uq.edu.au/HolgerBaumgardt/globular/parameter.html
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