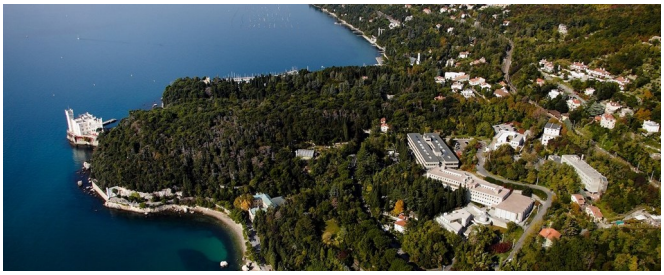

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# Dynamical evolution of the Milky Way globular clusters in cosmological timescale: interaction with the central Super Massive Black Hole

*Thursday 31 August 2023 10:10 (30 minutes)*

The main idea of the work is to perform the dynamic evolution of the orbits of Globular Cluster subsystems (GCs) with a look-back time up to 10 Gyr. This will allow us to estimate the possible interaction of GCs with the Galactic Center (GalC) region, including the influence of the super-massive black hole (SMBH), which has dynamically changed in the past. To reproduce the structure of the Galaxy in time, we used external potentials selected from the large-scale cosmological database IllustrisTNG-100, whose properties (mass and size of the disk and halo) are similar to the physical values of the Milky Way at present. In these potentials, we have reproduced the orbits of 147 GCs in 10 Gyr lookback time using our own high-order N-body parallel dynamical code, the phi-GPU code. For the initial proper motions, radial velocity and heliocentric distance of each GC, we take prom from the Baumgardt & Vasiliev (2021) catalog based on Gaia Data Release 3. To identify clusters that have interaction with the GalC and the SMBH, we used the criteria that the relative distance between the SMBH and the GC is at least four times the sums of the GCs half-mass radii. Using these simple criteria, we obtained statistically significant rates of close passages of the GCs with the Galactic Center and the SMBH. During our investigation, we analyzed the influence of the SMBH on the GC orbital evolution to find a GC that has such a close passage and prepare the statistical probability of such events. For the selected GCs, we generated an initial mass function and performed a full N-body modeling to find out the potential influence on the GCs stellar populations due to the SMBH influence in the Galactic Center region.

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**Session Classification:** Plenary Session