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Formation and evolution of the Nuclear Star Cluster in the Milky Way and other spiral galaxies on the cosmological time scale.

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According to the standard LCDM model, the globular clusters (GCs) of the Milky Way (MW) are the first gravitationally bound stellar systems to form in the early Universe, with a typical age of about 10-12 billion years. GCs are quite common in the Galaxy. In early 2020, 150 of them were found in the MW, in 2022 - 160, and more than 10 stellar systems are candidates for GCs. In the past few years, we have been getting more and more direct evidence for the existence of a supermassive black hole (SMBH) at the center of the MW and other galaxies. In addition to the SMBH, the Nuclear Star Cluster (NSC) is also located in the center of the Galaxy. Several mechanisms have been proposed for the formation of such NSCs. Two main ones are distinguished: (i) the migration of gas into the center of the Galaxy and the subsequent formation of the stellar content of the NSCs, and (ii) the migration of GCs into the center of the Galaxy and their subsequent destruction and total or partial merging with the compact central NSCs. The goal of our study is to numerically model the formation of NSCs by the dynamical interaction of GCs with the central region of the MW and other spiral galaxies (e.g., Andromeda), including the strong interaction with the central SMBHs. Based on the numerical calculations performed, qualitative estimates of the probabilities of complete and partial absorption of individual GCs in different orbits will be given.

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