

In this work we study the processes near the Galactic centre, which serves as a paradigm for low-luminosity galactic nuclei. The introductory part of the thesis is a brief review on the radio source Sagittarius A\* in the Galactic centre and on its immediate surroundings. The main part of the thesis focuses on the hypothetical population of neutron stars that should be present in large numbers in this region. We analyse the predictions concerning the encounters of this observationally unexplored population with the ambient interstellar medium and we discuss the distribution of their interaction modes with respect to the parameters of the system. We find out that this distribution is strongly dependent on the density of the ambient medium, whereas only weakly dependent on its temperature. The effect of the prolongation of rotational period is negligible on the time-scale of about ten thousand years. In the second part, we predict the evolution of the high-eccentricity passages of clouds and dust-enshrouded stars (with pericentre distances at about 1000 Schwarzschild radii from the black hole). In all studied cases a major part of the matter is diverted from the original path.