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APPLICATION OF QUANTUM TECHNOLOGIES FOR THE DEVELOPMENT OF AN INTELLECTUAL CONTROL SYSTEM TO SETUP CURRENTS OF THE CORRECTIVE MAGNETS FOR THE BOOSTER SYNCHROTRON OF THE NICA FACILITY

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One of the promising directions in the development of robust control systems for complex physical facilities is the application of quantum computing for building intelligent controllers based on neural networks and genetic algorithms. The main advantage of the application of quantum technologies is the high speed of adaptation of the intelligent control system (ICS) to changing conditions of functioning. The most promising solution is to use IBM's quantum processor for quickly calculating Grover's algorithm (GA) to find the "extremum" of the function of a set of control variables. For example, in the process of tuning the frequency of the HF stations of the NICA complex, unexpected "parasitic" oscillations may appear whose frequency spectrum cannot be predicted. In such conditions, the task of developing self-organizing ICS, capable of functioning and ensuring the achievement of the goal of control in emergency situations and information risk conditions, is relevant for the NICA complex.

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