

#### **4. Methods of high-performance numerical study of physical characteristics of superconducting Josephson structures in dependence of parameters of the models**

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Methods and software packages for parallel implementation of studying two models of superconducting structures are presented. The first model describes a system of coupled long Josephson junctions taking into account the inductive and capacitive coupling between neighboring junctions and electromagnetic radiation at their boundaries. The second model describes the structure of a point  $\varphi_0$  junction with spin-orbit coupling in a ferromagnetic layer and a pulsed current source acting on it.

The developed parallel computing methods made it possible to successfully study the physical characteristics in these models in a wide range of parameters. The parallel software packages have been deposited to the JINR program library and are freely available. The calculations were performed on the HybriLIT computing resources of the JINR Multifunctional Information and Computing Complex.