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Phase dynamics in coupled system of Josephson junctions and nucleation of longitudinal plasma wave

We study theoretically the phase dynamics of a stack of intrinsic Josephson junctions (IJJ) in the high- T_c superconductors. The current-voltage characteristics (CVC) of IJJ are numerically calculated in the framework of capacitively coupled Josephson junctions model with diffusion current. A detailed analysis of nucleation of longitudinal plasma wave for stacks with nine and ten IJJ is presented. Time dependence of the charge oscillations on superconducting layers is analyzed at different values of bias current. An influence of the number of junctions in the stack on the fine structure is investigated. We demonstrate an absence of the breakpoint region's fine structure in the stack with even number of junctions at periodic boundary conditions.

