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Resonance features of stack of long Josephson junctions

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**Abstract content (Max 300 words)
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The layered high- T_c anisotropic superconducting materials as $\text{Bi}_{2-x}\text{Sr}_x\text{CaCu}_2\text{O}_{8+\delta}$ can be considered as a stack of coupled Josephson junctions (JJ) [1]. Recently discovered quite intense coherent terahertz electromagnetic radiation from the system of intrinsic JJ provides wide possibilities for various applications [2,3]. The radiation is associated with a certain region in the current-voltage characteristic where parametric resonance has been observed [4,5]. Until now parametric resonance was investigated for the stack of short JJ, which length is less than Josephson penetration depth. Most of the experimental results are connected with long JJ, (for long JJ its length is more than Josephson penetration depth). Therefore, the investigation of stack of long JJ is an actual problem.

We investigate the phase dynamics of the stack of long JJ with inductive and capacitive couplings. The current-voltage characteristics (CVC) of JJ stack and the spatiotemporal dependence of electric charge in superconducting layers and magnetic field in the JJ were calculated. We have shown that in the system of long JJ arises longitudinal plasma wave and realize parametric resonance too. It has been demonstrated that in the stack of long JJ LPW and fluxons arises simultaneously.

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Level for award (Hons, MSc, PhD)?

PhD

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yes

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