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Coherent oscillations in a multilayered Josephson junction[1] SERHII SHAFRANJUK, JOHN KETTERSON, Northwestern University — The quasiclassical model is implemented to describe coherent oscillations between the quantized ABS bands in a multilayered Josephson structure (MJ) with an SIS′ unit cell. Using the model, we compute the local electron density of states versus the layer thickness ratio, purity, and the interface barrier transparency. Our analysis shows that narrow ABS bands are formed in a "clean" low-transparency MJ, when the electron transport across the layers is ballistic. Elastic scattering of electrons by non-magnetic impurity atoms in the MJ structure weakens the ABS bands, particularly when $\Delta\tau_i << 1$. When a bias voltage pulse $V(t)$ is applied across the MJ structure, it induces an a.c. current pulse, which is treated as a weak perturbation. The a.c. pulse induces coherent oscillations between two adjacent ABS bands of the MJ. The oscillations are pronounced in the Josephson supercurrent, and may be observed using an additional SIS Josephson junction connected in series with the MJ structure.

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