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Theory of spin wave excitation by Josephson current in a superconductor/ferromagnet/superconductor junction SHIN-ICHI HIKINO, MICHIYASU MORI, SABURO TAKAHASHI, SADAMICHI MAEKAWA, Institute for Materials Research,Tohoku University — The Josephson effect in a superconductor/ferromagnet/superconductor junction has been of considerable interest in recent years. Current-voltage (I-V) characteristics of superconducting weak links are studied by the resistively shunted junction (RSJ) model, which describes phase dynamics of superconductors (SC). The ferromagnet (F) has spin waves (SW). Therefore, in an S/F/S junction, it is important to treat the spin- and phase dynamics in an equal footing. However, the spin dynamics has not received much attention in the study of an S/F/S junction. We study the effect of the spin dynamics on the phase dynamics in an S/F/S junction. The RSJ model is extended to include the spin dynamics using gauge invariant phase difference between superconducting leads. We find that the I-V characteristics show step structures. The voltage at the steps is proportional to the SW energy in F. The origin of step structures will be discussed.

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