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Fluxon dynamics in two-band superconductor-based long Josephson junctions BAL-RAM GHIMIRE, HAO-YU TSAI, JU KIM, Department of Physics and Astrophysics, UNIVERSITY OF NORTH DAKOTA TEAM — We investigate the phase dynamics of a long Josephson junction (LJJ) with two-band superconductors such as MgB_2 and iron pnictides. Due to two condensates in each superconductor layer, the phase dynamics of a two-band LJJ, described by the perturbed sine-Grodon equation, becomes more complex than that for the usual LJJ with one-band superconductors. This complexity arises from the presence of interband Josephson current that yields soliton-like excitation. This excitation represents a large stable variation of the phase difference of the two condensates. Accounting for the soliton- like excitation, we find that the fluxon dynamics in the LJJ with two-band superconductors is influenced by the modulation of Josephson current. The Josephson current modulation yields radiation emission by the moving fluxon. Also, we discuss the effects of this current modulation on the current- voltage characteristics of the LJJ.

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