

Self- and cross-Kerr effects in Josephson junction chains

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ABSTRACT:

We study by microwave transmission measurements the propagation modes in Josephson junction chains of different lengths for different kinds of coupling to a transmission line. Some of the chains have been imbedded into the microwave strip line, while others have been coupled capacitively to it. The latter configuration enables a study of the internal quality factor of the chain while the first one is more suited to study quantitatively the Kerr effects occurring between different modes in the chain. The experimental dispersion curve fits well the theoretical prediction. We measured the Self- and Cross Kerr effects by two-tone spectroscopy measurements. We deduce from our measurements the Self-and Cross Kerr coefficients for the first 8 modes and compare them to theory.