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Resonance phenomena in nanomagnet + Josephson junction system under external periodic drive

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We demonstrated resonance effects in a system of nanomagnet coupled to the Josephson junction under the influence of external periodic drive. We show that the applied periodic drive brings to the appearance of additional resonance peaks, which positions determine by the driving frequency. The heights of the resonance peaks depend on the driving amplitude as a Bessel function. We develop a thorough analytical description that allows to classify all possible resonances arising in the system. The obtained result provide a method for controlling the resonance properties of the system. It has been demonstrated that by changing the amplitude of periodic drive it is possible to suppress the main ferromagnetic resonance and at the same time excite a new one with required aplitude and frequency. We consider that the obtained results open a wide field of research and applications related to the resonance properties of hybrid structures. Such a realization might play a crucial role in quantum information processing and spintronics.

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