Non-thermally induced of ultrafast magnetization precession in rare-earth Bi-doped iron garnets

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Excitation of the magnetization precession by femtosecond laser pulses, via the Inverse Faraday effect, in $Gd_{4/3}Yb_{2/3}$BIG single crystal was studied. We demonstrate dependenses on function of different parameters, including amplitude and direction of external magnetic field, temperature, wavelength of light pulses excitation and thickness of the sample. Temperature dependences of two different types of precession were observed as low-frequency magnetic field-depended mode and high-frequency field-independent mode. Obtained results have strong importance for non-thermal spins manipulation by polarized laser pulses. This work was supported by the SYMPHONY project operated within the Foundation for Polish Science Team Programme co-financed by the EU European Regional Development Fund, OPIE 2007-2013.