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TRANSVERSE MAGNETOOPTICAL KERR EFFECT TUNING BY VARIATION OF MAGNETOPLASMONIC CRYSTALS PROFILE

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Magnetoplasmonic nanostrucures are systems combing plasmonic and magnetooptical properties [1]. Magnetoplasmonic nanostructures have gained a lot of attention due to possibility to enhance significantly the magneto optical effects with respect to the ones of bulk ferromagnetics [2,3]. In one or two-dimensional corrugated or perforated metal gratings, called also magnetoplasmonic crystals, surface plasmon-polaritons (SPPs) which are propagating collective oscillations of conducting electrons of metals, are sensitive to the external transverse magnetic field. A lot of attention have been previously mentioned on design of magnetoplasmonic crystals and choosing materials for fabrication to achieve the largest magneto-optical response.

In this work, we investigated transverse magnetooptical Kerr effect (TMOKE) in one-dimensional all-nickel (Ni) magnetoplasmonic crystals, which are corrugated gratings with a different profile. We demonstrated that TMOKE can be adjusted in the visible wavelength range by variation of magnetoplasmonic crystal profile. We demonstrated that both a maximum value and the spectral behaviour of TMOKE are strongly depends on the magnetoplasmonic crystals. TMOKE value is grater in the case of sinusoidal profile grating (Fig.1a) with respect to one with non-sinusoidal profile (Fig.1b) at the same thickness (A) of corrugations.

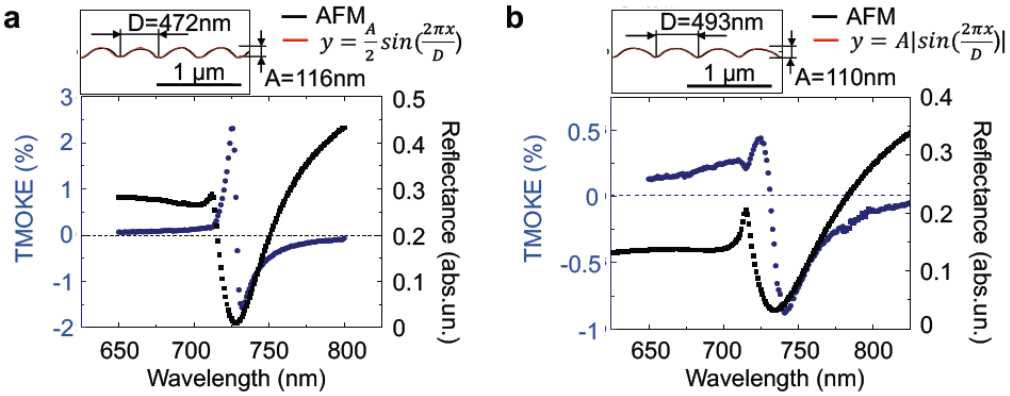

Fig.1. TMOKE and reflectance spectra at 20 degrees angle of incidence. a) grating with sinusoidal spatial profile. b) grating with non-sinusoidal spatial profile.

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[2] A.V. Chetvertukhin et al., *J. Appl. Phys.*, **111** (2012) 07A946.
[3] A. A. Grunin et al., *Appl. Phys. Lett.*, **105** (2014) 261908.