structures with sub-micrometer resolution for diverse fields of application.

In present work the direct one-step diffraction relief grating formation by polarization holography with the use of ChG NML of the composition based on As_2S_3–Se, $As_{37}S_{58}Ge_5$–Se and As_2S_3:Mn–Se was studied. It was shown that vector holographic gratings are formed on the surface of the samples under the two linear polarized beams falling on the sample surface at ±45° and the left-right circular polarizations relative to grating vector. The kinetics of diffraction efficiency of polarization gratings were compared with intensity gratings recorded at two paralel linear polarizations. The possible explanations based on dielectrophoretic forces existing in fluidic systems, and H. Fritzche' model supposing the presence of minimum isotropic volume with the anisotropic structural units are discussed.

2D transition metal dichalcogenides for spintronics

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In this talk I will present recent results regarding spin dynamics in graphene - based *transition metal dichalcogenides (TMDC)* heterostructures.

Identifying the main microscopic process for spin relaxation in graphene and graphene-based van der Waals heterostructures is one of the most fascinating puzzles for the graphene and spintronics communities [1]. Key information can be obtained from the spin-lifetime anisotropy, which is determined by the preferential direction of the spin-orbit fields that cause the spin relaxation and can be quantified by the ratio between the spin lifetimes for perpendicular and parallel spin components to the graphene plane. We have recently developed a reliable experimental approach to measure such anisotropy ratio [2]. We found that the spin-lifetime in graphene on silicon oxide or hBN is isotropic and independent of carrier density and temperature down to 150 K. Current understanding indicates that the spin relaxation is driven by magnetic impurities or weak random spin-orbit or gauge fields [2]. On the other hand, a large SOC enhancement has been predicted when graphene is interfaced with TMDCs. Signatures of the enhancement have been reported, but the nature of the spin relaxation remained unknown. Here we observe strongly anisotropic spin dynamics at room temperature in bilayer heterostructures comprising graphene and tungsten or molybdenum disulphide [3]. The spin lifetime varies over one order of magnitude depending on the spin orientation and is largest when the spins point out of the graphene plane. The latter suggests that the strong spin–valley coupling in the TMDC is imprinted in graphene and felt by the propagating spins (Fig. 1) [4].

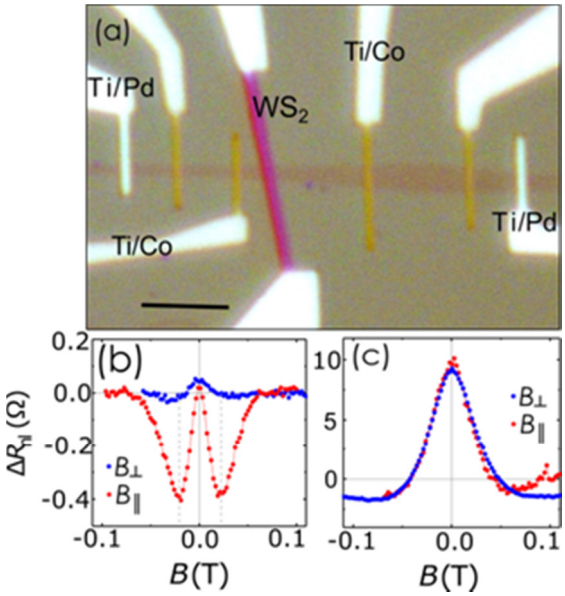

Fig.1. Spin relaxation anisotropy in graphene-tungsten disulphide. (a) Optical image of a device. (b) Spin precession measurements with out-of-plane and in-plane (along the graphene channel) magnetic field demonstrating anisotropic spin dynamics. (c) ibid (b) in a reference graphene device showing no signatures of anisotropy. See Ref. [3]

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