

Combination of magnetic and semiconductor properties in (Ga,Mn)(Bi,As) nanostructured thin films

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Driven by the high requirements for modern technologies, we combined miniaturization and state of the art concepts development within spintronic nanostructures made from thin films of the (Ga,Mn)(Bi,As) quaternary alloy [1]. We will present nanostructures of cross-like and ring-shape geometries, tailored using electron-beam lithography patterning and chemical etching from 10-nm thick (Ga,Mn)(Bi,As) epitaxial layers with 6% Mn and 1% Bi contents. A specific interplay between the anisotropies arising in the structures creates a resistance difference between contact pairs, providing its utility for memory units, that can be driven by an applied low magnetic field or a spin-polarized current and increased as a result of enhanced spin-orbit coupling by bismuth incorporation.

References:

[1] K. Levchenko et al., J. Supercond. Nov. Magn. 30, 825 (2017)