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Flexomagnetic effect in Mn-based antiperovskites RENAT SABIRIANOV, PAVEL LUKASHEV, University of Nebraska at Omaha — We report our theoretical results on the induced magnetization appearance in antiferromagnetic antiperovskites, such as Mn_3GaN, due to the gradient of applied external strain (flexomagnetic effect). We model the external flexure by forming a 40-atom $Mn_{24}Ga_8N_8$ supercell with 4 domains under external strain gradient. This structure shows a net magnetization which increases parabolically up to $0.03\mu_B$ (per Mn atom) in the (0,-1,1) direction reflecting non-linear contribution to local piezomagnetric effect in the considered range of up to 0.005% external strain gradient. The calculated flexomagnetic effect is found to be relatively small with induced magnetic moment order of magnitude smaller than that of piezomagnetic contribution. The flexomagnetic effect can be especially important in the nanostructures, where the stress gradients are usually large due to the surface tension. All calculations were performed using the projector augmented wave method.

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