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Fabrication and study of CoF_2O_4 structures on Graphene substrates employing scanning probe microscopy techniques[1] IRMA KULJANISHVILI, Saint Louis University, Dept. of Physics, MARKO SURTCHEV, NT-MDT America Inc,, JOHN CAVIN, Saint Louis University, Dept. of Physics, ALEXANDER SMETANA, SAJU NATTIKADAN, NanoInk Inc — Graphene materials are being investigated in recent years for verity of applications, including electric and optical devices and novel substrates. In this study we explore the route for assembling micro- and nanoscale architectures of magnetic complex oxide material directly on graphene surface using 'direct write' parallel patterning techniques. Ferrimagnetic oxide $CoFe_2O_4$ (CFO) was prepared by sol-gel chemical route and used as 'ink' for patterning structures. An array of CFO dots was fabricated using Dip Pen Nanolithography method at specific locations. Here we will discuss the surface properties of the formed dot structures of $CoFe_2O_4$ on graphene as compared to those formed on Si/SiO_2 substrate. Structures fabricated on each substrate with the same ambient conditions and thermal processing show different morphology and magnetic interactions when studied using AFM and MFM techniques. We will describe our findings and results acquired on individual CFO dots of different sizes. We will also show that graphene substrate is likely influencing the magnetic characteristics of CFO dots that are formed on its surface, although the role of graphene as a substrate for CFO dot formation should be further investigated.

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Irma Kuljanishvili
Saint Louis University, Dept. of Physics

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