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Interplay of Magnetism of Superconductivity in Graphitic Nanostructures YAO AN, ROBERT MEULENBERG, Department of Physics and Astronomy and Laboratory for Surface Science and Technology, University of Maine — The main foci in modern high temperature superconductivity (HTS) research are two-fold: (a) in conventional HTS finding new machinable materials necessary for any real world applications and (b) discovering new materials for that elusive room temperature superconductivity (RTS). It is quite evident that the potential applications for HTS or RTS are immense, and could show tremendous cost savings in various industries. To date, most reports of RTS have been eventually disproved; however, recent work has suggested that graphite flakes can exhibit RTS when treated with water. This extraordinary claim, if true, offers a wide range of stimulating physics to be studied in RTS. A main obstacle toward RTS in carbon based materials is ruling out whether one is truly observing superconductivity, or simply magnetism. In this talk, we will discuss effects of solution exfoliation of graphite powders. Not surprisingly, drastic changes to the graphite powder are observed. These changes, mainly in the form of graphene sheet exfoliation and defect formation, suggest a form of magnetism and not superconductivity in the treated powders via SQUID magnetometry measurements. A method for preparing graphitic monoliths that allow for transport measurements will be presented.

Yao An
Department of Physics and Astronomy and Laboratory for
Surface Science and Technology, University of Maine

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