Magnetic behavior of carbon nanostructures

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The large number of morphologies formed by sp^2 bonded carbon on the nanometer scale lies at the origin of their electronic behavior covering the entire range from good conductors to large-gap insulators. An intriguing question is, whether carbon nanostructures may show an unexpected response to applied magnetic fields, or acquire a permanent magnetic moment of their own. I will discuss the unexpected giant magnetoconductance that is postulated to occur in twisted nanotubes in presence of an applied magnetic field [1]. In heterostructured nanotubes, partly filled states at the interface of carbon and boron nitride segments may acquire a permanent magnetic moment. Depending on the atomic arrangement, artificially formed C/BN superlattices may exhibit an itinerant ferromagnetic behavior [2]. In other all-carbon nanostructures, presence of carbon radicals may lead to ferromagnetic behavior with a high Curie temperature [3].

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