

Abstract Submitted
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Fabrication of Si:P delta-doped layers with varying doping densities TINGBIN LIM, BYRON VILLIS, SAMADHAN PATIL, STEVEN SCHOFIELD, NEIL CURSON, GABRIEL AEPPLI, Univ Coll London, COMPASSS TEAM¹ — We are developing a programme to fabricate atomic scale device structures of phosphorus atoms in a silicon substrate. The first step in this process is the fabrication of 2D Si:P delta-doped layers in silicon, which have recently also been theoretically studied in terms of electrical transport by Hwang and Das Sarma (E. H. Hwang and S. Das Sarma, *Phys. Rev. B*, **87**, 125411). The Si:P delta-doped layers are expected to exhibit interesting behaviors when the density of the P atom doping is varied through the metal-insulator transition, as well as for the high ($\sim 10^{14}$ per cm^2) and low (below 10^{13}) doping regimes. We are fabricating Si:P delta-doped layers of varying densities from around 6×10^{12} to 2×10^{14} P atoms per cm^2 , which we will use to experimentally assess the theoretical findings of Hwang and Das Sarma. Details of the fabrication process will also be discussed.

¹Coherent Optical and Microwave Physics for Atomic-Scale Spintronics in Silicon (COMPASSS)

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