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A universal parametric representation for weak-localization magnetoconductance in 2D and 3D systems[1] GUY MATMON, London Centre for Nanotechnology, University College London, ERAN GINOSSAR, Advanced Technology Institute, University of Surrey, BYRON VILLIS, ALEX KLKER, TINGBIN LIM, London Centre for Nanotechnology, University College London, NEIL CURSON, London Centre for Nanotechnology and UCL Department of Electronic and Electrical Engineering, University College London, JUERONG LI, BEN MURDIN, Advanced Technology Institute, University of Surrey, ANDREW FISHER, London Centre for Nanotechnology and UCL Department of Physics Astronomy, University College London, GABRIEL AEPPLI, Paul Scherrer Institute and Department of Physics, ETH Zurich — We study the magnetotransport properties of a heavily-doped Si:P 2D layer, as a step towards the fabrication of buried ordered dopant structures and wires. The magnetoconductance $\Delta\sigma$ is dominated by weak localization. A combination of linear and angular magnetic field sweeps reveals the existence of a single dimensionless parameter p, which governs the magnitude of $\Delta\sigma$ as a function of magnetic field magnitude and inelastic scattering length (which is temperature dependent). We compare this with weak localization in bulk Si:P and find that even though the magnetic-field dependence of $\Delta\sigma$ is logarithmic in 2D and power-law in 3D, their dependence on p is unchanged, thus establishing a universal behavior that is independent of dimension.

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