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Observation of Fano Interference and Field Dependence by Raman Spectroscopy of Molecularly Doped Silicon BRIAN BURKE, KEITH WILLIAMS, JACK CHAN, University of Virginia — We have investigated various doping techniques on silicon to form thin, highly p-doped layers near the surface (approximately 10 nm). We are able to observe through Raman spectroscopy the signature Fano lineshape present in the zone-centre optical phonon. We have defined high resolution channels by electron beam lithography and subsequently annealed adsorbed dopant molecules into the silicon lattice by RTA. We have performed sheet resistance measurements as well as Raman mapping to characterize the doping profile. The Raman laser line of 325 nm provides a penetration depth of roughly 8 nm, ideal for studying the surface of silicon. After studying the highly doped channel, electrodes were deposited and field dependence measurements were made. Additionally, IETS and transport measurements have been conducted for various geometries to compare with Raman data.

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