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Low-temperature transport in high quality strained Ge channels in SiGe BENJAMIN ROESSNER, Laboratory for Solid State Physics, ETH Zurich, Zurich, Switzerland, HANS VON KAENEL, Politecnico di Milano, Como, Italy, DANIEL CHRASTINA, Politecnico di Milano, Como, Italy, GIOVANNI ISELLA, Politecnico di Milano, Como, Italy, BERTRAM BATLOGG, ETH Zurich, Zurich, Switzerland — Presently, the mobility of holes in strained germanium achieved so far exceeds 100000 cm^2/Vs at a carrier density of $\sim 8*10^{11} cm^{-2}$. For lower carrier density, the highest reported mobilities are roughly proportional to the carrier density. Accessing the upper left corner in the density-mobility diagram remains a challenge. Background charges, inhomogeneous strain distribution and growth defects are the main difficulties of growing strained Ge channels. We have fabricated high quality Ge channels and measured the transport parameters at temperatures down to 0.4 K. We discuss the influence of growth problems on the mobility as a whole and how these mechanisms may influence the magnetic field dependence of the sheet resistance. We explore the effects of different doping geometries, in particular backside doping and symmetrical doping on electrical transport, including the effects of dopant segregation. Our quantitative analysis shows that local charged impurities dominate the scattering rate. It also shows the effect of too low substrate temperature, leading to point defects whose existence can be detected by a pure transport measurement.

Benjamin Roessner
Laboratory for Solid State Physics, ETH Zurich, Zurich, Switzerland

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