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Heavily *n*-doped Ge: Low-temperature magnetoresistance properties on the metallic side of the metal–nonmetal transition

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ABSTRACT

We report here an experimental and theoretical study on the magnetoresistance properties of heavily phosphorous doped germanium on the metallic side of the metal–nonmetal transition. An anomalous regime, formed by negative values of the magnetoresistance, was observed by performing low-temperature measurements and explained within the generalized Drude model, due to the many-body effects. It reveals a key mechanism behind the magnetoresistance properties at low temperatures and, therefore, constitutes a path to its manipulation in such materials of great interest in fundamental physics and technological applications.

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