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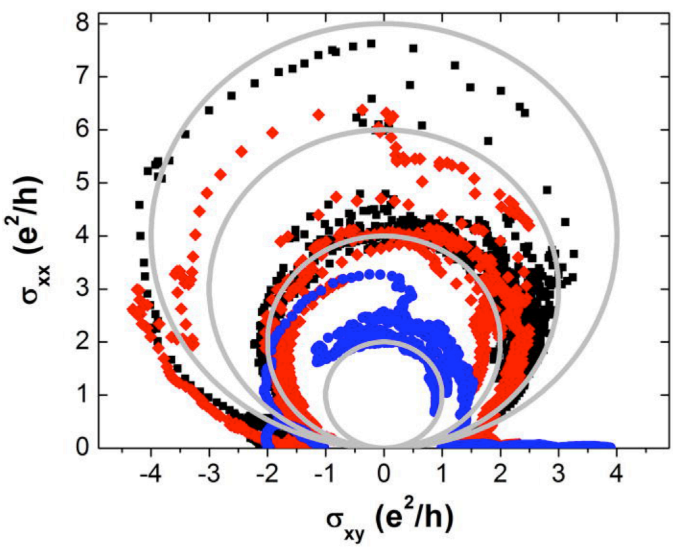
Sandia Quantum Transport Article Was the 12th Most Downloaded Paper from AIP's *Applied Physics Letters* in February

Research on topological insulators (TIs) has drawn intensive interest. The type-II InAs/GaSb heterostructure, due to its unusual alignment of the conduction and valence band edges of InAs and GaSb, is predicted to be a two-dimensional (2D) TI.

Historically, type-II InAs/GaSb heterostructures have been extensively studied for infrared applications. With the new prediction as a 2D TI, this material system is believed to hold great potential for future quantum computation. In their article, the team presents their recent quantum transport results around the charge neutrality point (CNP) in a type-II InAs/GaSb field-effect transistor.



σ_{xx} vs σ_{xy} at B = 20 T (blue dots), 25 T (black squares), and 30 T (red diamonds). Gray circles are defined by $(\sigma_{xx} - N)^2 + \sigma_{xy}^2 = N^2$, with N = 1, 2, 3, and 4.

Charged carrier (electron and hole) transport shows noisy behavior around the CNP at extremely high B fields. When the diagonal conductivity σ_{xx} is plotted against the Hall conductivity σ_{xy}, an unexpected conductivity circle law is observed (see figure). A better understanding of this new conductivity circle law is expected to lead to better quantum applications.

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Exceptional Service in the National Interest