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A Quantum Hall Effect without Landau Levels in a Carbon Nanotube.

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<p>The spectrum of a carbon nanotube in a strong enough magnetic field (>50T for a 3nm nanotube) revealed an almost dispersionless band at the Fermi energy. The formation of Landau levels has been theoretically and experimentally investigated. In experimental studies the existence of Landau levels is indirectly derived from longitudinal conductance measurements. We will show that a more direct indication of Landau Levels in the system exists, namely a quantized Hall effect. We present numerical results that show the application of an electric field along the length of the tube lead to a current circulating the circumference and, furthermore, that the conductance is exactly e2/h. This is interesting because the magnetic flux averages to zero around the tube's circumference. This phenomenon could be explained in terms of the two-dimensional topological theory for the quantum Hall effect even though this system is quasi-one dimensional.

Level (Hons, MSc,
   PhD, other)?

MSc

Consider for a student
   award (Yes / No)?

Yes

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

No

Primary author: Ms BRAND, Nanette (Stellenbosch University)

Co-author: Dr SNYMAN, Izak (National Institute of Theoretical Physics)

Presenter: Ms BRAND, Nanette (Stellenbosch University)

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