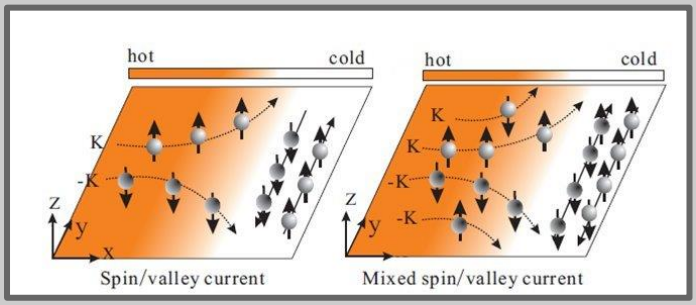
Center for Nanostructured Graphene

CNG NEWSLETTER

October 2015

RESEARCH NEWS



Two-dimensional materials with a hexagonal lattice structure possess a valley degree of freedom, in additional to the more familiar charge and spin degrees of freedom. If, in addition, they are gapped – such as MoS_2, they may have a nonvanishing Berry curvature, which is a special property of their band structure. Berry curvature gives rise to extra driving forces in addition to external electric and magnetic fields, or thermal gradients. Materials belonging into this category host a plethora of exotic transport phenomena, in particular if a finite spin-orbit coupling is present. In a recent work a team consisting of Chinese researchers from Chinese Academy of Sciences, Beijing, and Prof. Jauho of CNG, a new transport phenomenon in this class is discovered: a pure transverse spin current driven by a longitudinal thermal gradient. Likewise, a pure valley current may occur, as illustrated in the figure. Importantly, no net charge current is induced, and the predicted effects are thus nondissipative. Also, a device geometry, where this new effect may be observed, is proposed. Estimates for MoS_2, and for other transition-metal dichalcogenides, suggest that the new effects could be useful in a new family of devices – called spin caloritronics. The work is presently considered for publication in Physical Review Letters.

EVENTS

The annual **CNG 2 day seminar** will this time take place 10-11 November 2015. The seminar is a great opportunity for all of CNG to get together, present and discuss their work.

The **CNG Café** will be resumed after the summer holiday, Tim Booth and Nicolas Stenger will organize the events.

The 6th **Carbonhagen Symposium** on carbon and related nanomaterials took place on 13-14 August 2015. The symposium was a great success with 140 participants and 25 speakers. You can read more about the event here

OTHER NEWS

Otto Mønsted Visiting Professorship:
Dr. Arkady Krasheninnikov, Helmholz Zentrum Dresden Rossendorf, Germany, will be visiting CNG for 3 months. He is an internationally acclaimed expert in computational studies of the structure of graphene and other 2D materials.

UPCOMING LECTURES – by CNG faculty

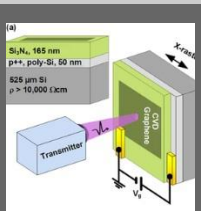
Professor N. Asger Mortensen, DTU Photonics, gives an invited talk at AOM'2015, in Hangzhou, China, 28-31 October 2015

Professor Peter Bøggild, DTU Nanotech, gives an invited talk "Imaging the electrical properties of CVD graphene with light" at Graphchina 2015, Qingdao, October 29 2015.

Professor Kristian Sommer Thygesen, DTU Physics, gives an invited talk at the Workshop on "Computational plasmonics: an ab initio and multiscale perspective", Lausanne, Switzerland, 2-4 November 2015

Professor Antti-Pekka Jauho, DTU Nanotech, gives an invited talk at CECAM workshop: Open Quantum Systems Computational Methods, Hong Kong, 30 November – 5 December 2015

You can read more here



NEW PUBLICATION

Buron, Jonas Christian Due; Pizzocchero, Filippo; Jepsen, Peter Uhd; Petersen, Dirch Hjorth; Caridad, Jose; Jessen, Bjarke Sørensen; Booth, Tim ; Bøggild, Peter (2015) Graphene mobility mapping, *Scientific Reports*, Vol. 5, 12305

Read more at www.cng.dtu.dk