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Imaging the Incipient Wigner electron lattice in a quantum wire SHENG-CHIN HO, HENG-JIAN CHANG, CHIA-HUA CHANG, Department of Physics, National Cheng Kung University, GRAHAM CREETH, SANHEEV KUMAR, MICHAEL PEPPER, Department of Electronic and Electrical Engineering, University College London, JONATHAN GRIFFITHS, Cavendish Laboratory, J.J. Thomson Avenue, Cambridge, IAN FARRER, Department of Electronic and Electrical Engineering, University of Sheffield, Mappin Street, Sheffield, GERAINT JONES, DAVID RITCHIE, Cavendish Laboratory, J.J. Thomson Avenue, Cambridge, TSE-MING CHEN, Department of Physics, National Cheng Kung University
— One-dimensional system abounds with physics especially considering electron-electron interaction. Electrons have been theoretically predicted to form a zigzag Wigner crystal when the electron density in a quantum wire approaches to specific magnitude. SO far such Wigner crystallization can only be inferred from conductance plateaus [1,2] and spatially resolved imaging of it remains a challenge. Here we utilize magnetic focusing technique[3] to probe the formation of a Wigner lattice, in which the spatial distribution of electrons in a quantum wire reveals itself in the magnetic focusing spectrum. Evolution from a focusing peak singlet to doublet — in response to a one -dimensional single row transport to Wigner crystallization— is shown when the density is continuously varied. Additionally, the focusing peak doublet is found to develop into a singlet with increasing temperature. [1] W. K. Hew *et al.* Phys. Rev. Lett. 102, 056804 (2009). [2] L. W. Smith *et al. Phys. Rev. B* 80, 041306 (2009). [3] H. van Houten et al., Phys. Rev. B 39, 8556(1989).

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