

Two-Dimensional Electron Liquid State at Oxide Interfaces^a

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Abstract. Two-dimensional electron gases based on conventional semiconductors such as Si or GaAs have played a pivotal role in fundamental science and technology. Their high mobilities enabled the discovery of the integer and fractional quantum Hall effects and are exploited in high electron mobility transistors. Recent work has shown that two-dimensional electron systems can also exist at oxide interfaces [1]. These electron systems are characterized by properties that fundamentally differ from those shown by semiconductors - they may, for example, form electron liquids and be superconducting as well as magnetic. In the presentation I will provide an overview of our studies of the properties of these unusual electronic systems (see, *e.g.*, [2,3]) and explore the potential of electron liquids at oxide interfaces for the use in nanoscale electronic devices.

^a The presentation slides are available at the website
http://www.its.caltech.edu/~vehgroup/documents/ITAP2011_Conference_Mannhart.pdf

References

1. A. Ohtomo et al., *Nature* **419**, 378 (2002).
2. N. Reyren et al., *Science* **317**, 1196 (2007).
3. J. Mannhart and D.G. Schlom, *Science* **327**, 1607 (2010).