

[SS-01] 초청강연

Electronic Structure and Critical Fluctuation of Nanowires on a Si Surface

Lyo, In-Whan

Institute of Physics and Applied Physics, Yonsei University, Seoul, South Korea

One-dimensional homogeneous metallic nanowires are inherently unstable with respect to symmetry breaking perturbations. One of such examples is the Peierls instability that could induce a metal-insulator transition by opening a single particle gap across the Fermi level. We find that Au/Si(557) [1] and In/Si(111)-4x1 [2] represent such systems that go through a metal-insulator phase transition, particularly in the latter case, to a charge density wave (CDW) state at low temperature. We will show that atom-resolved imaging of a metal-insulator transition reveals such unprecedented details that it gives us a new insight into critical fluctuation phenomena.

On the other hand, nanowires inhomogeneous at nano-scale have not been explored before, partly due to the need of a truly local experimental probe and the challenging complexity of such wires. We show that Au/Si(111)-5x2 [3] is such a system unique with metal-semiconductor phase separation and its metal-insulator interfaces gives rise to the nano-scale equivalent of Schottky barriers.

[참고문헌]

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