SEMINAIRE MAGNETISME et SUPRACONDUCTIVITE

Orsay - Palaiseau - Saclay

CEA Orme des Merisiers-Saclay
Ecole Polytechnique - Palaiseau

Laboratoire Léon Brillouin - Saclay
LPS-Université Paris-Sud - Orsay

Lundi 31 mai 2010 à 14 Heures
(Bât 510 - Orsay – **Moyen Amphi**)

Moses Chan
Penn State University

Proximity and Anti-proximity effects in nanowires

When a ferromagnet is placed in contact with a superconductor, the Cooper pairs from the superconductor are not expected to survive beyond at most a few nanometers into the ferromagnet. Surprisingly we find when a cobalt nanowire as long as 600 nm is sandwiched between superconducting electrodes, it attains zero resistance at low temperature. For even longer wires, the transition to incomplete superconductivity via this (long range) proximity effect is foreshadowed by a large resistance peak (1). On the other hand when Zn nanowires of 40 nm diameter are contacted by superconducting electrodes, their superconductivity is unexpectedly suppressed (2). Results of ongoing experiments to confirm this anti-proximity effect in an individual aluminum nanowire will also be presented.

1. Wang et al., PRL 102, 247003(2009); Nature Phys. **6**, 389 (2010)

2. Tian et al., PRL 95, 076802 (2005); PRB **74**, 014515 (2006)

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