

Supporting Information for

Propagating Surface Plasmon Induced Emission from Quantum Dots

Hong Wei,[†] ‡ Daniel Ratchford,[‡] Xiaoqin (Elaine) Li,[‡] Hongxing Xu,^{†§,*} Chih-Kang Shih^{‡,*}

* Corresponding authors. E-mail: hxxu@aphy.iphy.ac.cn; shih@physics.utexas.edu

[†] Beijing National Laboratory for Condensed Matter Physics and Institute of Physics,
Chinese Academy of Sciences, Box 603-146, Beijing 100190, China

[‡] Department of Physics, The University of Texas at Austin, Austin, Texas 78712,
USA

[§] Division of Solid State Physics/The Nanometer Structure Consortium, Lund
University, Box 118, S-22100 Lund, Sweden

1. Examples showing the QDs were excited by the SPs in Ag NWs, not by the scattered light of the laser:

For the Ag NW with a kink in Figure S1a, QD emission along the NW was observed when the 710 nm laser was focused on the position in the red circle, while no emission along the NW was observed when the laser was focused on the position in the green circle. In Figure S1b, two Ag NWs are shown. When the laser was focused on the tip of either NW, no emission on another NW was observed. For the NW shown in Figure S1c, there is a Ag nanoparticle near the NW at the position in the red circle. When the laser was focused on the particle position, QD emission along the NW was observed. When the laser was focused on the position in the green circle which is 2 μ m away from the NW, no emission along the NW was observed. These three examples show that the QD emission along the Ag NW was excited by the propagating SPs in the Ag NWs, not by the scattered laser light.

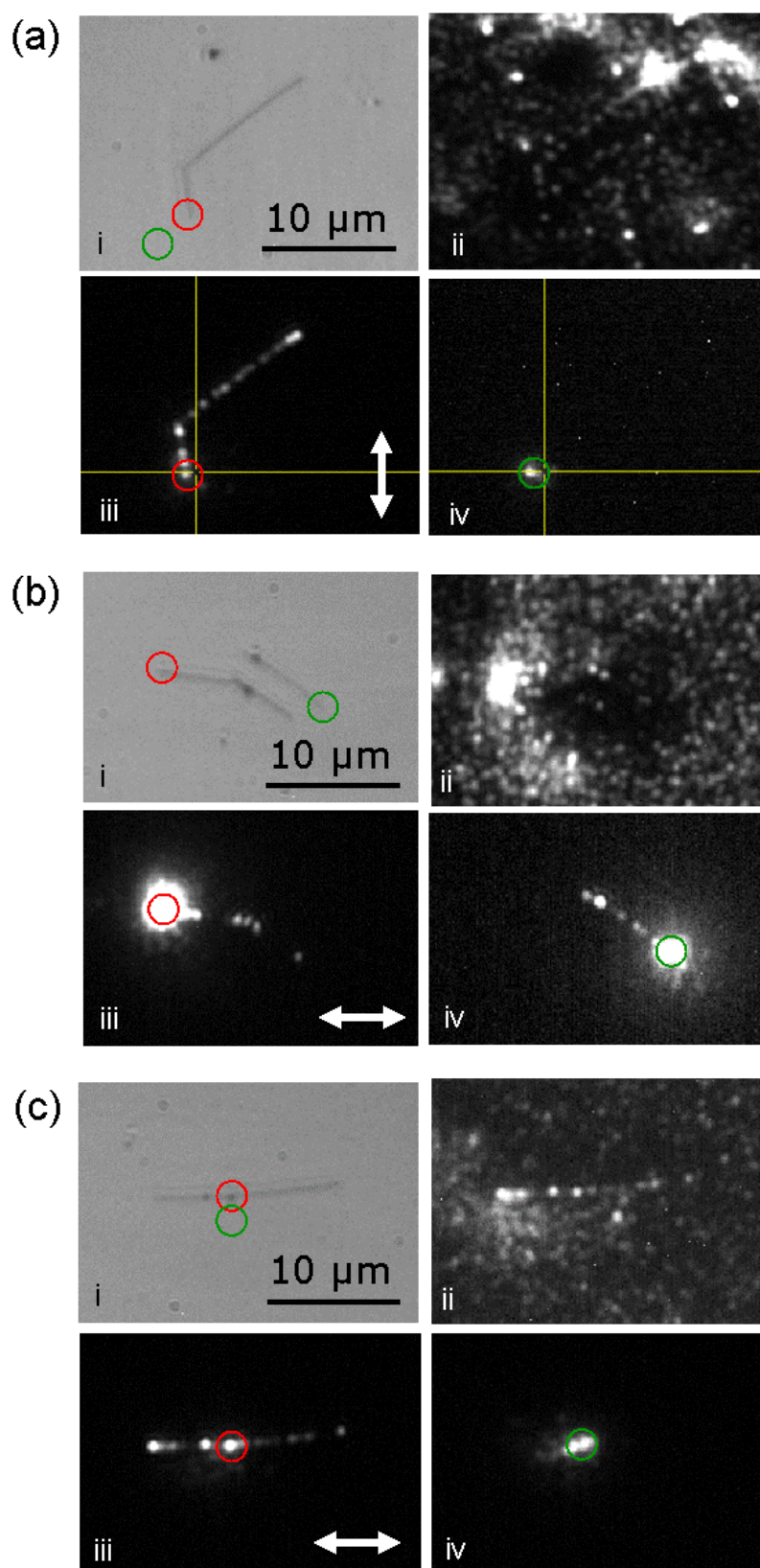


Figure S1. Three systems (a-c) showing that the QDs near the Ag NWs were excited by the propagating SPs in the Ag NWs, not by the scattered light of the laser. In (a-c),

(i) White light transmission images of Ag NWs. The scale bar is 10 μm and the same for all the images. (ii) QD emission images with wide-field excitation by 532 nm laser. (iii) Images of QD emission induced by propagating SPs in the Ag NWs with the laser focused on the spots marked by the red circles. The white arrows show the laser polarization. (iv) Images obtained when the laser was focused on the spots marked by the green circles.

2. QDs excited by laser at different wavelengths:

For the Ag NW shown in Figure S2a, QD emission image with wide field excitation by 532 nm laser is shown in Figure S2b. QD emission along the NW was observed when a laser of 705 nm and 750 nm was focused on the bottom tip of the NW, respectively, as shown in Figure S2c and 2d. When the laser was tuned to 880 nm, no QD emission was detected (Figure S2e), although propagating SPs were launched in the Ag NW (Figure S2f). This is because the QDs have no absorption at 880 nm.

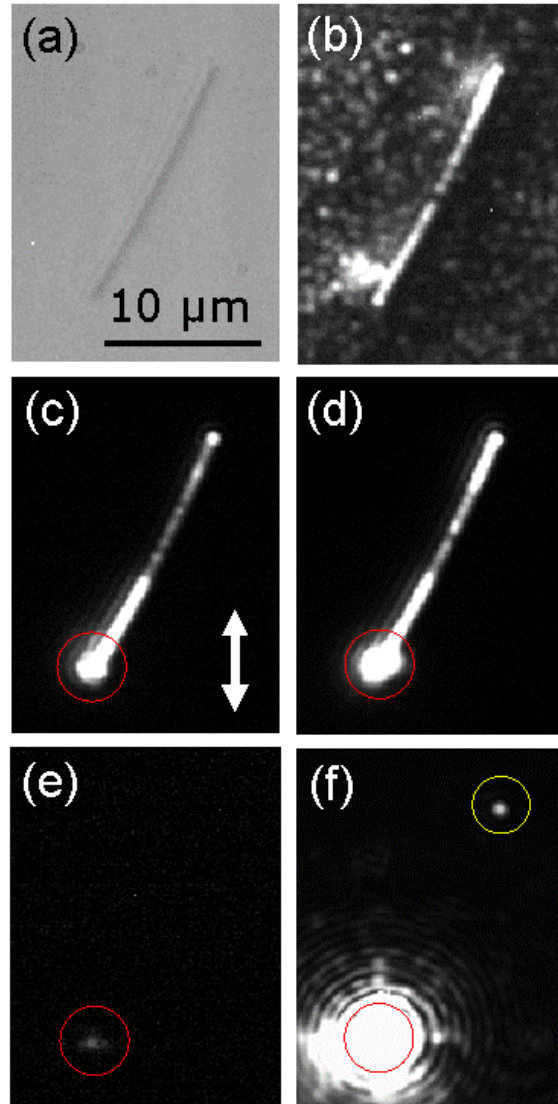


Figure S2. (a) White light transmission image of an Ag NW. The scale bar is 10 μm and the same for all the images. (b) QD emission image with wide-field excitation by 532 nm laser. (c-e) Images of QD emission induced by propagating SPs in the Ag NW with 705 nm, 750 nm and 880 nm laser, respectively. The red circles mark the position of the laser focus. The white arrow shows the laser polarization. (f) Optical image with 880 nm laser focused on the bottom tip of the NW.