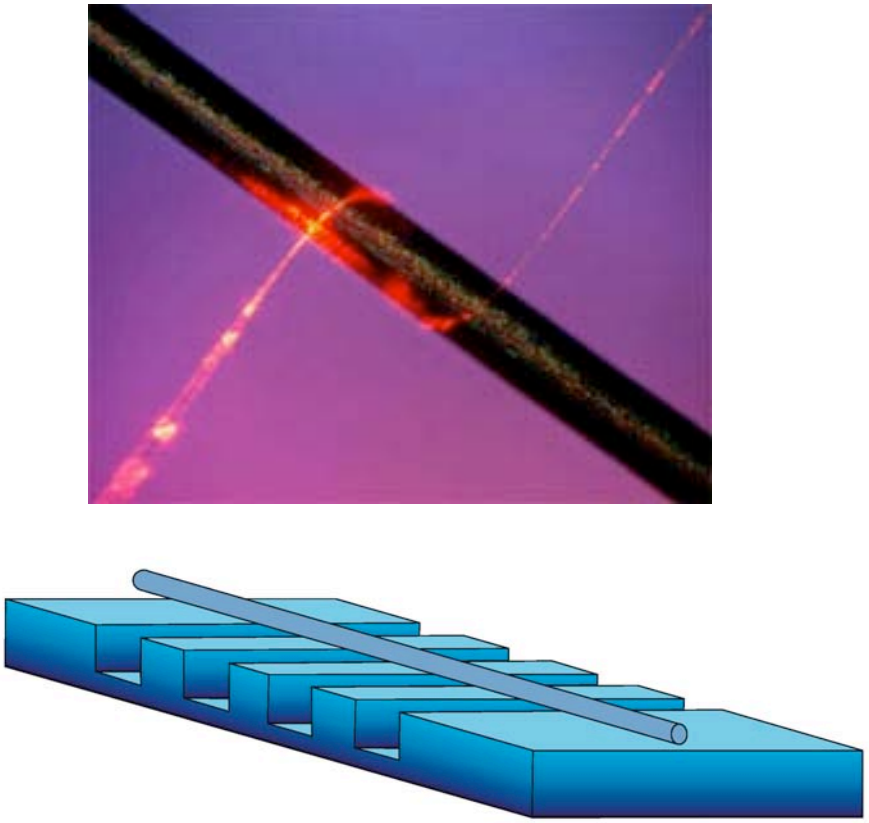
Evanescent Field Bragg Gratings Using Silica Nanowires

Anthony C. Vicari*, Jason E. Dowd**, Eric Mazur***
*Harvard College, Cambridge, MA, 02138
**Department of Physics, Harvard University, Cambridge, MA, 02138
***School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, 02138

Modern communication networks rely on silica fiber to transmit light. These fibers, as thin as a hair, act as light pipes, moving information at light speed. We have drawn nanowires from these fibers, with diameters smaller than the wavelength of the light they carry. As a result, guided light is carried both in and around the nanowire. The surrounding light, or evanescent field, interacts with the environment.

Multiple frequencies are used in standard optical fiber to increase the amount of information one fiber can carry. Particular frequencies can be filtered or reflected using Bragg grating structures. Bragg gratings consist of alternating layers of material with different refractive indices. By milling trenches into a mesoporous silica substrate, we fabricate Bragg gratings that interact with the evanescent field around our nanowires without altering the nanowire itself.

Such nanowire Bragg gratings could further reduce the size of optical and photonic devices in modern communication networks.



Top: Nanowire guiding light around a hair
Bottom: Diagram of the proposed Bragg grating structure

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