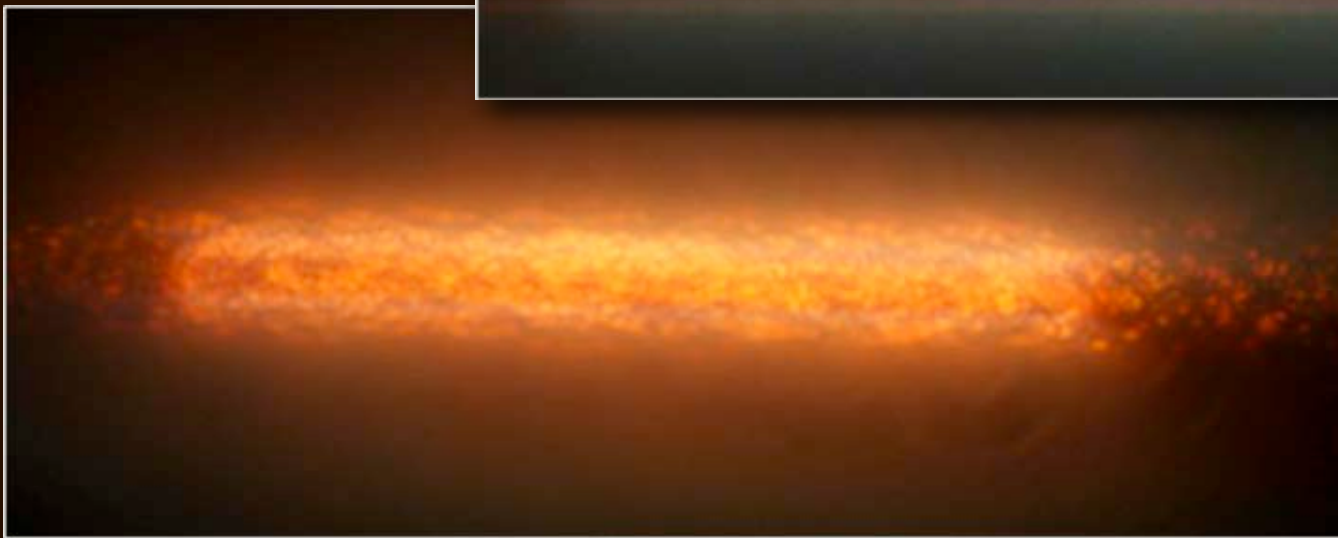
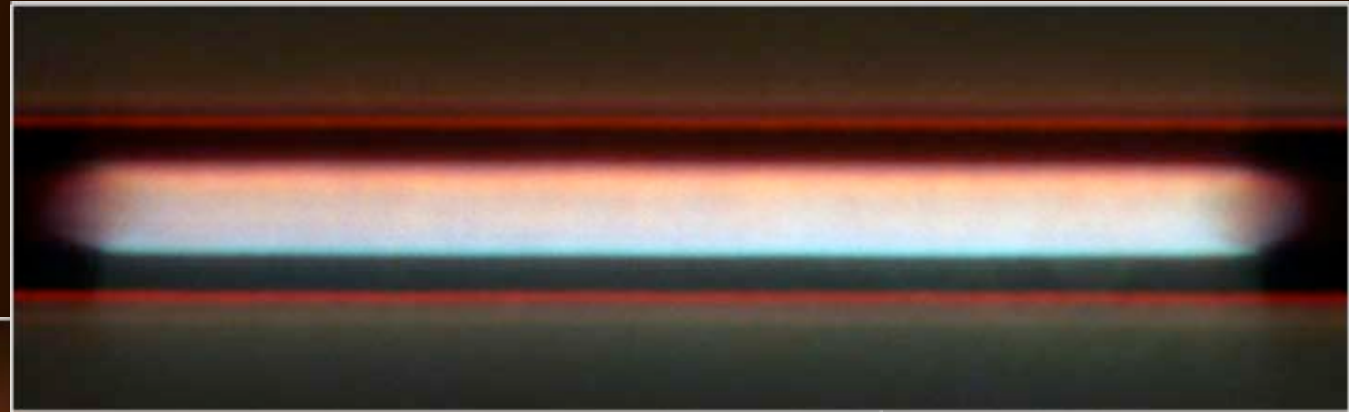


A smooth ride for infra-red photons



Rough waveguides, such as this poorly deposited in-fiber silicon wire, lose too much light to be useful.

MRSEC researchers have discovered how to fabricate ultra-smooth silicon wires within the pores of optical fibers. These fiber-embedded wires can carry light as waveguides, a first step towards the marriage of chip-based electronics with optical fibers. The images above use differential interference microscopy, which is sensitive to less than 0.5 nanometers of roughness: since no roughness is observed in the upper image, this waveguide may well be atomically smooth, the ultimate limit of smoothness.

Work performed by the groups of J. Badding, V. Gopalan, P. Sazio and V. Crespi in IRG 4 of the Penn State MRSEC Center for Nanoscale Science, under DMR-0213623.