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Luminescence from suspended carbon nanotubes

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Single walled carbon nanotubes are produced in a wide range of species with different diameter and chirality. Since two of three nanotube species are predicted to be semiconductors with a direct bandgap, efficient photoluminescence is to be expected for this materials system. Recent experimental breakthroughs have shown that proper isolation of the nanotube from its environment is crucial, and suspension of nanotubes on substrates patterned with pillars is proving to be a method of choice. This presentation will review two years of research on the luminescence properties of suspended nanotubes, from ensemble measurements to individual nanotubes. Some properties are truly remarkable and can be identified as consequences of the stiffness of the carbon-carbon bond, the one-dimensional nature of SWNTs, and their maximally exposed surface area.