



# Evanescence in Optical Microscopy with Applications to Cell Biology

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## **Abstract:**

Evanescent light (which decays quickly in one spatial dimension) has properties that make it useful for a variety of studies in cell biology. In fluorescence excitation, evanescence constitutes basis of the familiar TIRF illumination. The unique polarization properties of TIRF can report on deformations in the cell membrane. TIRF can also be combined with localized photobleaching to measure mobility of proteins. Applications of both to the dynamic process of cellular secretion are discussed. In fluorescence emission, evanescence constitutes the basis of the fluorophore near-field. By capturing that near field, images of surface-proximal fluorophores can be recorded. Point-by-point measurement of near field /far field ratios can provide absolute distances of fluorophores to a surface. In principle, pseudo-images of these distances could be reconstructed by scanning.

## **Bio**

Daniel Axelrod is a Professor Emeritus in Physics and in Biophysics at the University of Michigan, Ann Arbor, and also has an appointment in the Dept. of Pharmacology of the University of Michigan Medical School. He received a BS in Physics and Math from Brooklyn College of the City University of New York, and a Ph.D. in Physics from UC Berkeley. He was then a postdoc in Applied and Engineering Physics at Cornell University. He is an elected Fellow of the Biophysical Society.