

## **Detection of the Precursor Film in Front of the Moving Contact Line Using Fluorescence Microscopy**

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For wetting fluids it is known that a microscopic precursor film exists in front of the moving contact line. The structure of this thin film has been studied theoretically, but previous experimental investigations were limited by the resolution of the measurement system (lateral or vertical) required to capture the complete scope of this feature. We studied the evolution of free surface of spreading droplets near the moving contact line using a total internal reflection fluorescence microscope (TIR-FM). A schematic picture of this method is shown in Fig. 1(a). The TIR-FM system can detect nano-particles and fluorescence materials approximately 100 nm from the substrate with high spatial resolution. We were able to detect and quantify the length and evolution of the precursor films at the vicinity of moving contact line. We compared our measurement for the length and free surface profile of precursor films with available theories and found the dynamic characteristics of the precursor films have a good agreement with the available theoretical results.

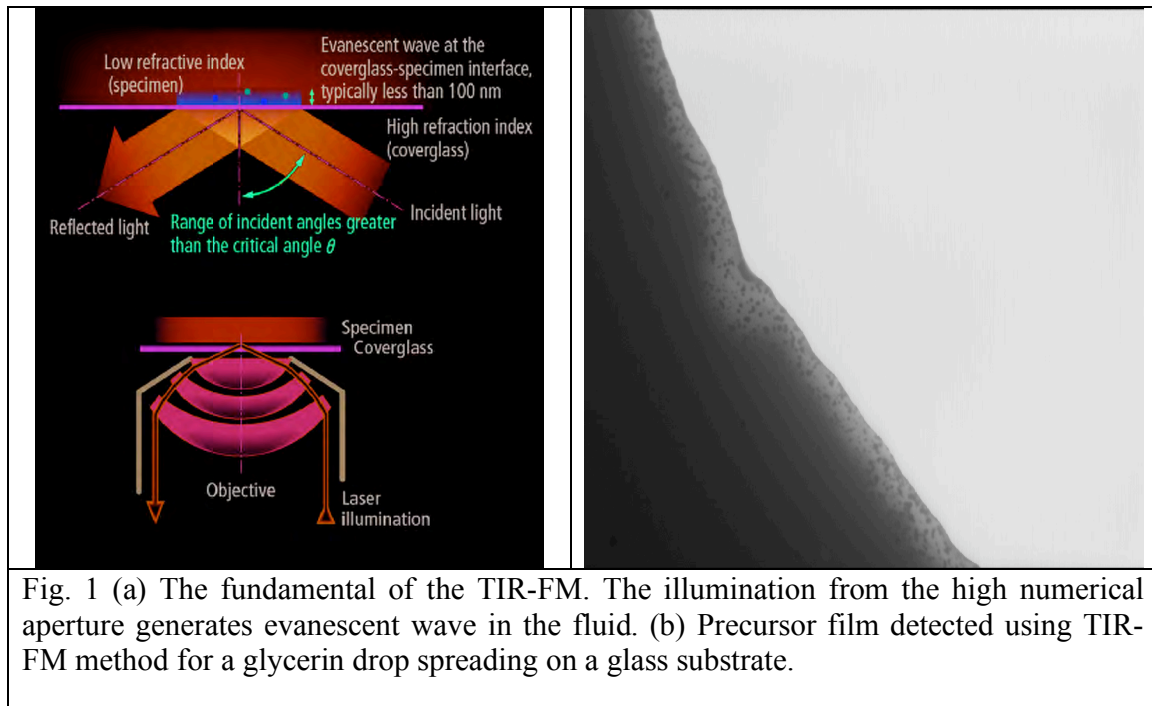


Fig. 1 (a) The fundamental of the TIR-FM. The illumination from the high numerical aperture generates evanescent wave in the fluid. (b) Precursor film detected using TIR-FM method for a glycerin drop spreading on a glass substrate.