

Description of Additional Supplementary Files:

Supplementary Movie 1: Focusing of light near the focal plane of our objective chip. It was recorded by moving the collection system (containing a 0.95NA objective lens, a tube lens and a CCD camera) with a high-precision nano-stage.

Supplementary Movie 2: Imaging process of a “corner” object by using our objective chip. This video records the dynamic images when the “corner” object is moved across the ideal objective distance of $z=1.2f$.

Supplementary Movie 3: A video recording the reflective signal in our proposed reflective confocal microscopy when the sample is near the focal plane. The four-lobe intensity is the background signal that comes from the undesired reflection of light at the bare substrate of our objective chip.