Supporting Information

Acoustofluidic Scanning Nanoscope with High Resolution and Large Field of View

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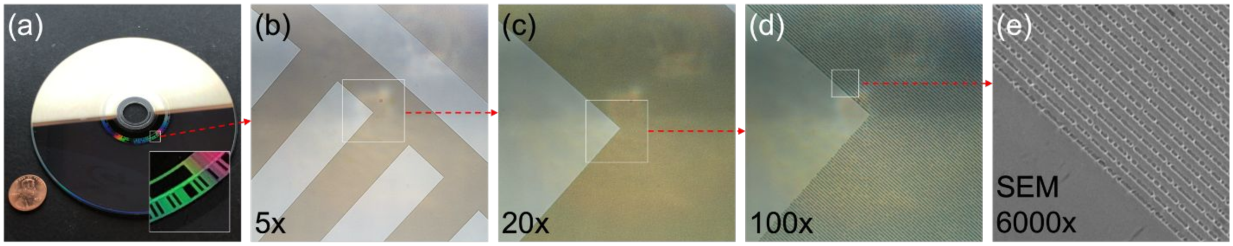

Figure S1. Magnified images of Blu-ray disc surface are taken by different microscope objective and SEM. (a) Actual size comparison with a penny. (b) 5x, (c) 20x, and (d) 100x microscope images. (e) 6,000x SEM image.

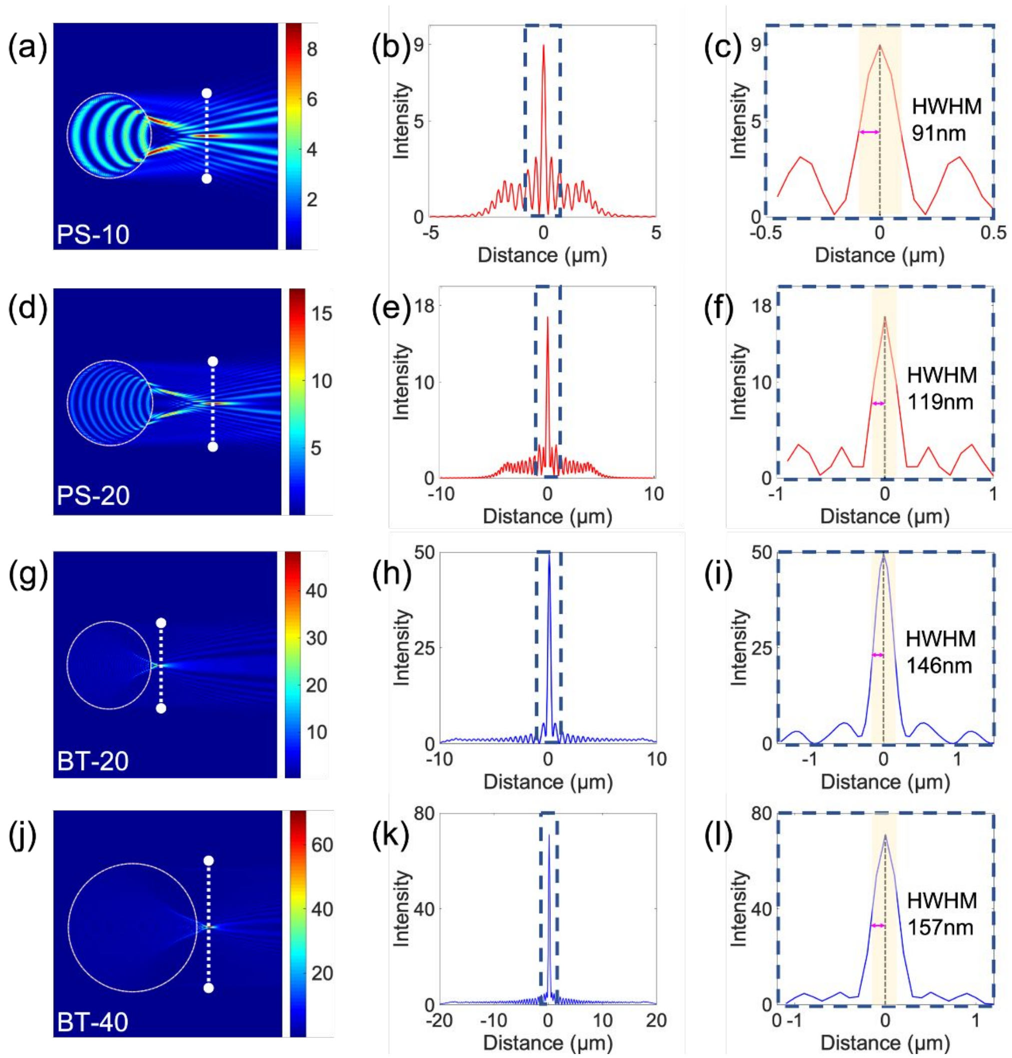

Figure S2. Analysis of super-resolution effects in different materials and sizes of microparticles. Line profile through the simulated focus and the Half-Width at Half Maximum (HWHM) value of (a-c) PS-10, (d-f) PS-20, (g-i) BT-20, and (j-l) BT-40, respectively. The HWHM values indicate that the focused beam width is smaller than the wavelength of propagated illumination (532 nm).

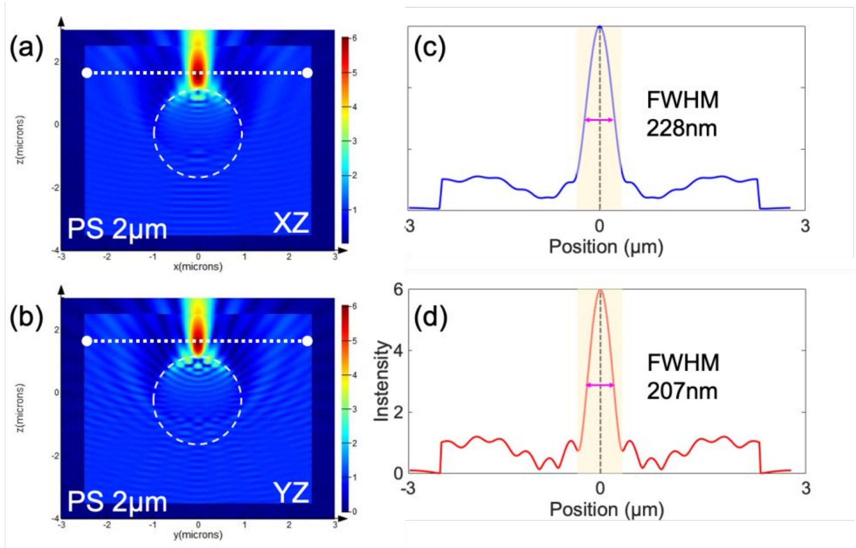

Figure S3. Simulation results of a 2 μm PS bead along two orthogonal directions with the FDTD method. A monochromatic 532 nm incident light was propagated along the positive z-axis. The polarization of the light is along the x direction. (a) and (b) shows the focus of the microparticle at two orthogonal planes (XZ and YZ plane). (c) and (d) show the line-plot cross the center of the focus of (a) and (b), respectively. The FWHM are 228 nm and 207 nm along the X and Y directions, respectively. Therefore, the resolution in the Y direction will be slightly better than that in the X direction.

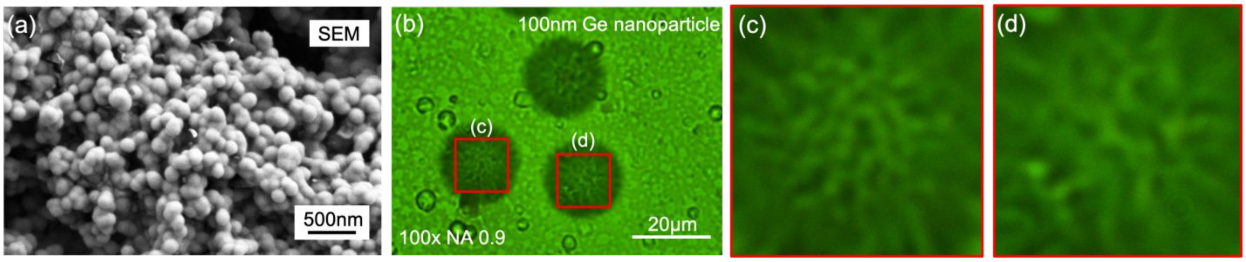

Figure S4. (a) SEM image of Ge nanoparticles. (b) 100 nm Ge nanoparticles imaging through a PS-20 microsphere with a 100x/0.9 NA objective lens. (c) and (d) optical images in the area marked with a red box in Fig. S3(b).

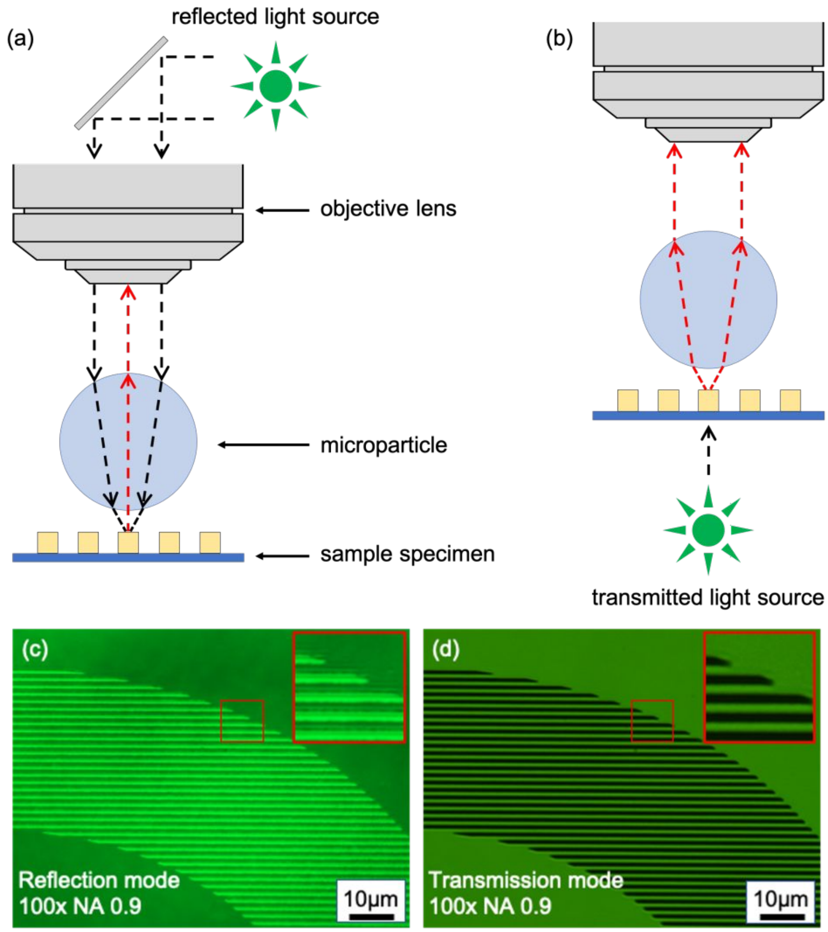

Figure S5. Schematic explanation of two different light illuminations. Black arrow shows a light pathway from a source, and red arrow shows a light pathway after through microparticle. (a) Reflected light illumination is passing through microparticle two times. (b) Transmitted light illumination is passing through microparticle once. Optical image of an 800 nm chrome grating with an 100x NA 0.9 objective lens in (c) the reflection mode and (d) the transmission mode, respectively.

Frames	5	10	20	50	100	200	500	1000	3500
FOV (%)	2.87	4.40	7.18	13.25	22.24	38.07	62.69	83.58	99.23
Time (min)	0.40	0.79	1.72	4.06	7.69	15.42	38.18	80.02	284.08

Table S1. The percentage of the FOV imaged *versus* the number of imaging frames and processing time.

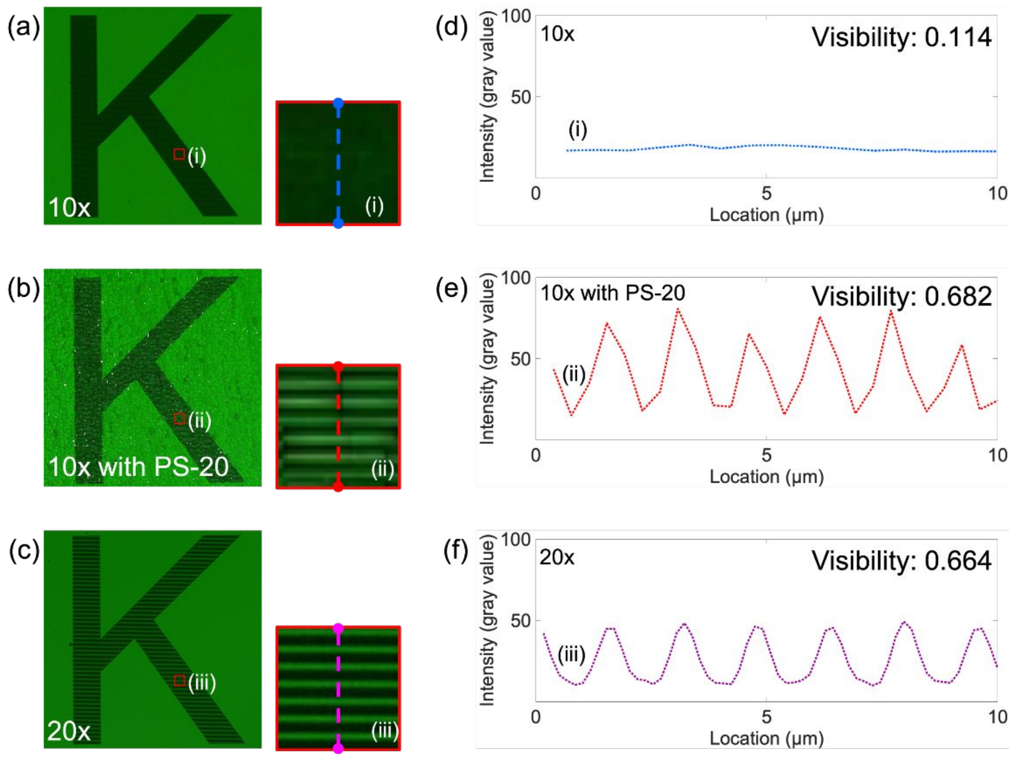

Figure S6. Comparison of optical resolutions of 800 nm chrome grating patterns of letter "K". (a) Image taken by a 10x objective lens. (b) Scanned image by 10x objective with PS-20 microparticles. (c) Image taken by a 20x objective lens. (d) Plot profile and visibility value of red box (i) from 10x objective imaging. (e) Plot profile and visibility value of red box (ii) from 10x objective with PS-20 microparticle scanned image. (f) Plot profile and visibility value of red box (iii) from 20x objective.

Video SIV1. Microparticle movement by an acoustic energy distribution. We applied 3 V_{PP}, 2.1 kHz, and 1 sec interval burst to the acoustofluidic device.

Video SIV2. Microparticle movement and tracking. Six moving microparticles were searched and recursively merged into final image as Fig. 6(b).