Miniature endomicroscopes using multimode fibers



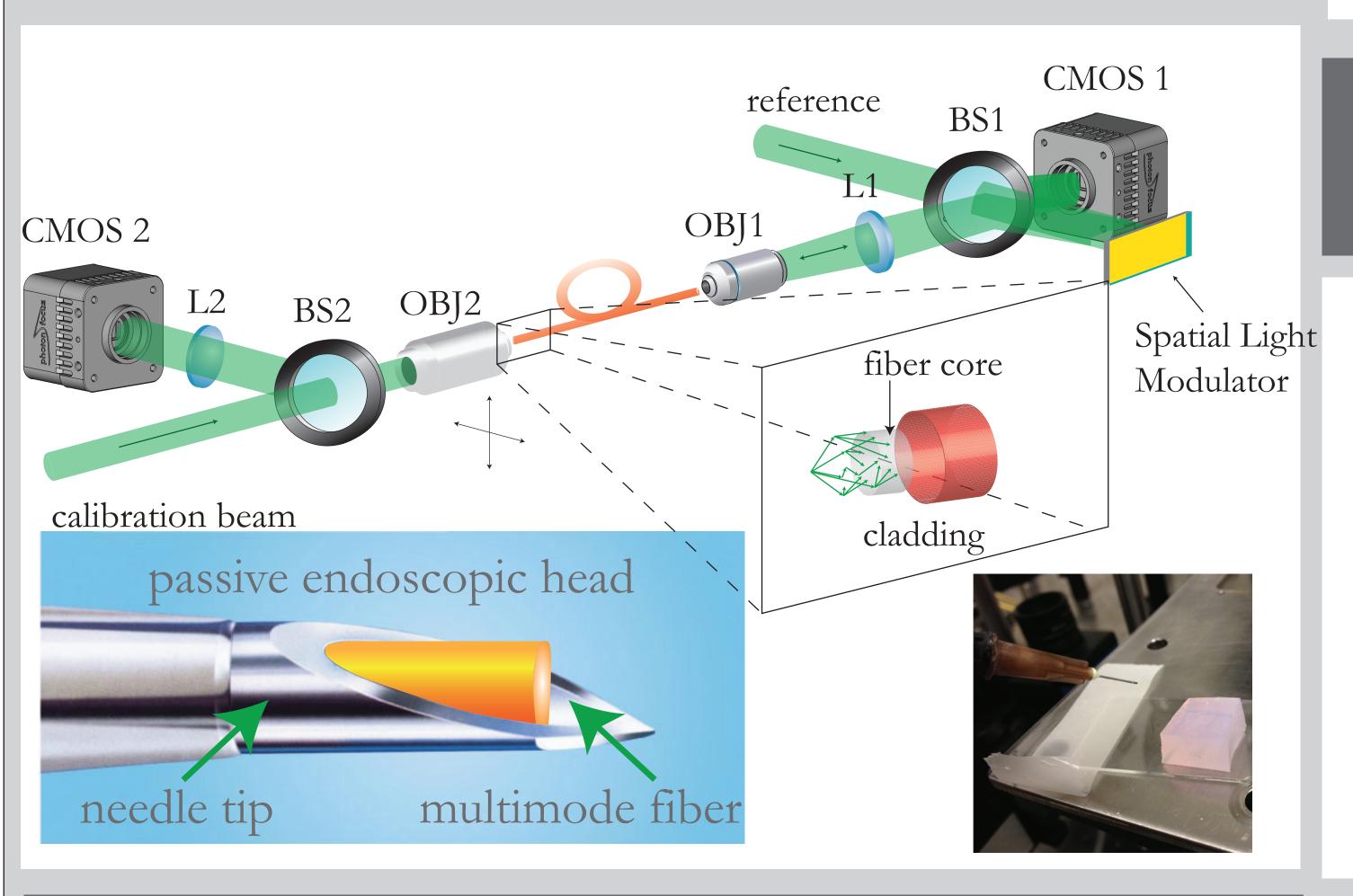
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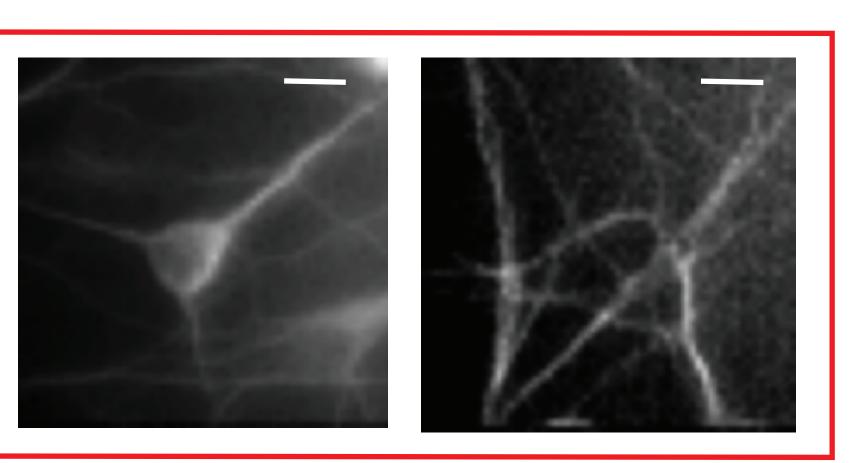
Fiber bundles vs. Multimode fibers as imaging devices

Ultra-thin needle head multimode fiber endoscope

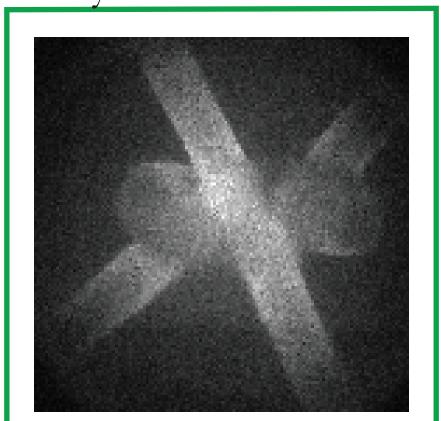


High resolution fluorescence and photoacoustic imaging





OR-PAM imaging of nylon wires' knot

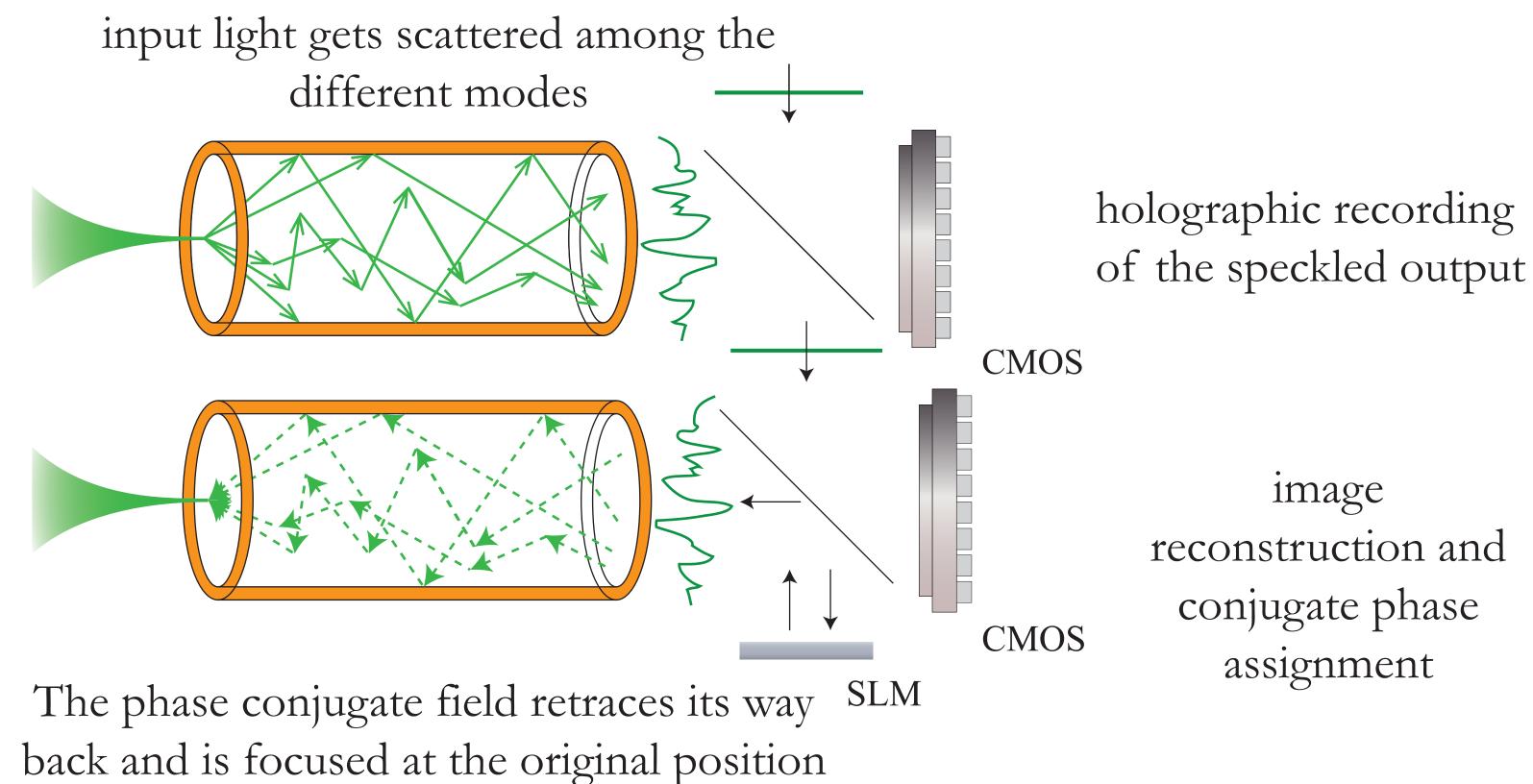


Diagnosis based on cellular phenotype is enabled

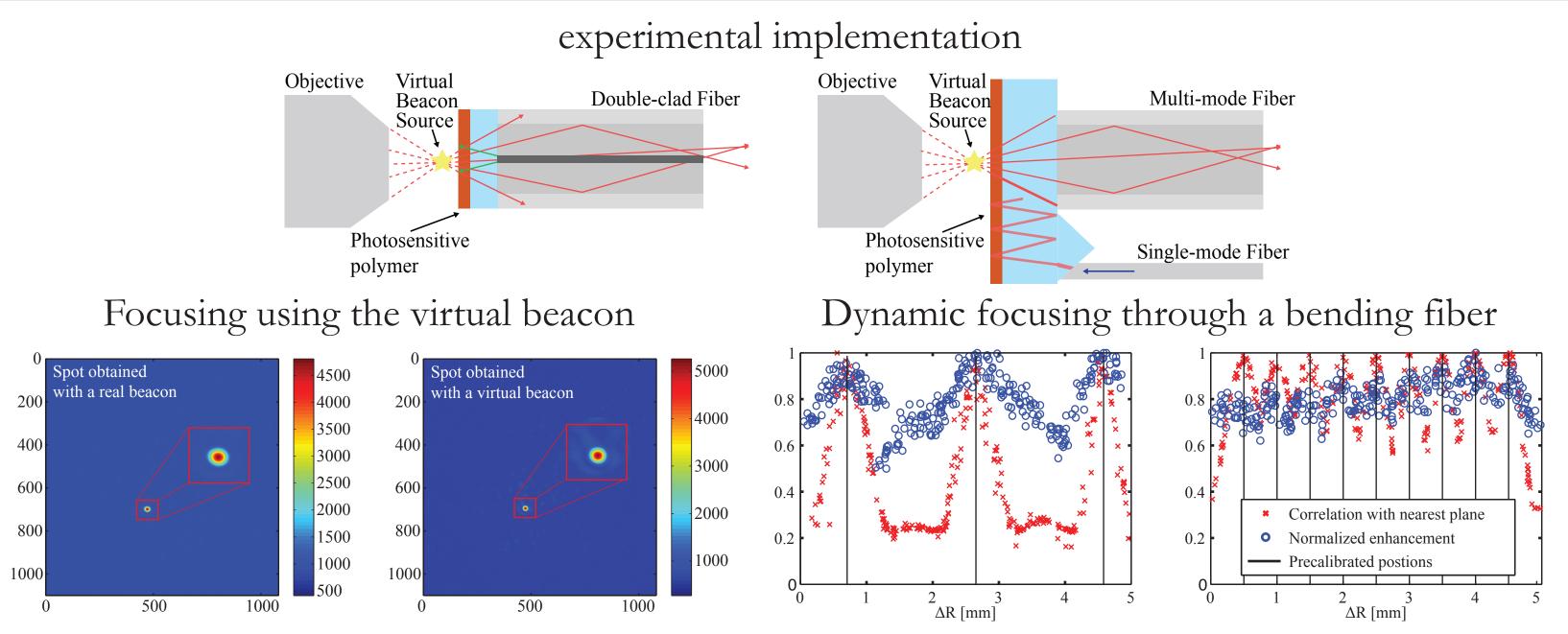
Imaging of cochlea hair cells for hearing loss diagnosis directly inside the inner ear

Conventional image Multimode fiber image Detector Coupler MM Fiber MM Fiber

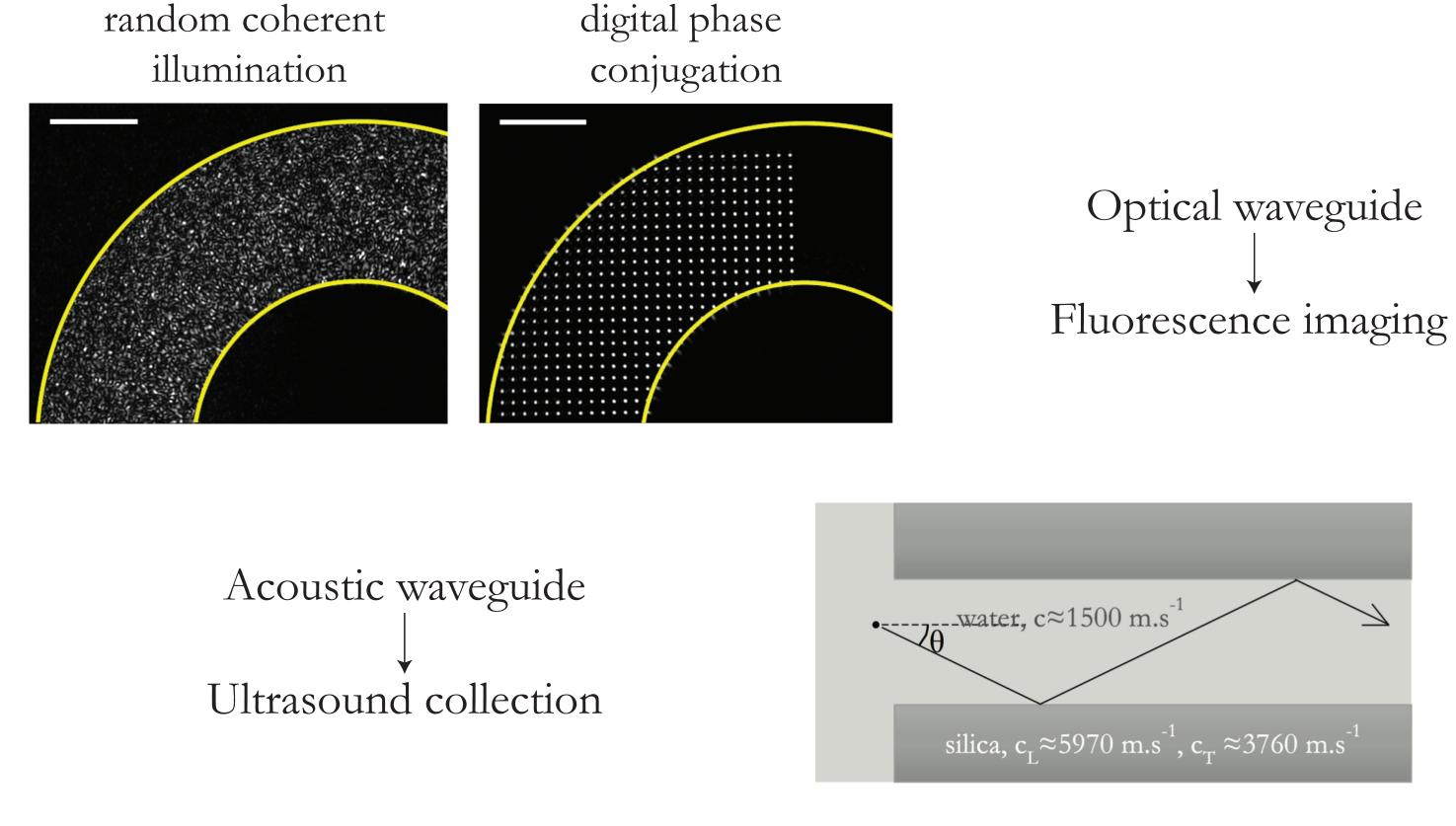
Principle of Digital Phase Conjugation through a multimode fiber



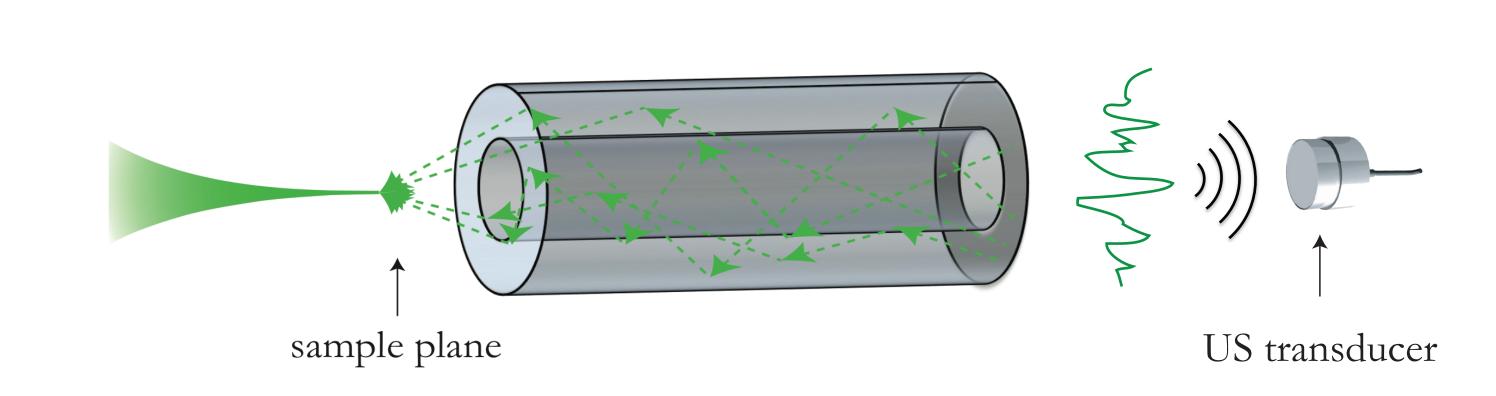
Dynamic bending compensation through a multimode fiber



Multimodal endoscopy through a multimode capillary waveguide



Fluorescence and OR-PAM imaging through the same device using DPC



References

I. N. Papadopoulos, S. Farahi, C. Moser, and D. Psaltis, "Focusing and scanning light through a multimode optical fiber using digital phase conjugation," Opt. Express 20, 10583 (2012).

I. N. Papadopoulos, S. Farahi, C. Moser and D. Psaltis, "High-resolution, lensless endoscope based on digital scanning through a multimode optical fiber," Biomedical Opt. Express 4, 260 (2013)