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### HOLLOW-CORE OPTICAL FIBERS: A ROAD MAP TO MULTIFUNCTIONAL FIBERS

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This presentation describes the history, guiding mechanism, recent advances, applications, and future prospects for hollow-core negative curvature fibers. One-dimensional slab waveguides, two-dimensional annular core fibers, and negative curvature tube lattice fibers are used to illustrate the inhibited coupling guiding mechanism. Antiresonance in the glass at the core boundary and a wavenumber mismatch between the core and cladding modes inhibit coupling between the modes and have led to remarkably low loss in negative curvature fibers. This presentation will explain recent advances in negative curvature fibers that improve the performance of the fibers, including negative curvature that increases confinement, gaps between tubes that increase confinement and bandwidth, additional tubes that decrease mode coupling, tube structures that suppress higher-order modes, nested tubes that increase guidance, and tube parameters that decrease bend loss. Recent applications of hollow-core fibers are also presented, including mid-infrared fiber lasers, micromachining, and surgical procedures. Future prospects for hollow-core fibers will be given at the end.

### BIOGRAPHY

Jonathan Hu is an associate professor in the department of electrical and computer engineering at Baylor University. He received his PhD. degree from the University of Maryland, Baltimore. Before he joined Baylor University in August 2011, he spent two years as a research associate at Princeton University. He has many years of research experience in optical sciences and engineering with expertise in the areas of chalcogenide glass fibers, photonic crystal fibers, nanophotonics, 2D materials, and surface plasmons. He has served as referee for 20 journals in optics, physics, and materials. He has also been session chairs for multiple international conferences. He served as a topic co-chair for Mid Infrared Photonics (MIP) in the IEEE summer topical meetings (2015) and a committee member in NOMA Conference in OSA advanced photonics (2018). He received Baylor Young Investigator Development Award in 2015. He also serves as a Baylor Fellow in 2018.

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