

## Novel Plastic Optical Fiber for UHD era in IoT society “Capillary of Light”

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### Abstract

Internet traffic continues to grow with the increase of network-connected devices in the Internet of Things (IoT) era. This trend will be significantly accelerated by the implementation of ultra-high-definition (UHD) imaging technologies in various applications, and existing core, metro, and access optical networks, including datacenter networks, are under urgent development. However, optical fibers have not been introduced into households located in optical network terminal areas, although UHD device connections require decompressed data transmission at more than 100 Gb/s. Here, we demonstrate new concepts for optical link stabilization by microscopic material properties of a novel graded-index plastic optical fiber (GI POF) for the emerging UHD applications. The low-noise GI POF has microscopic heterogeneities in the core materials, allowing for unprecedented stable and robust data transmission through strong mode coupling with a mechanism that is fundamentally different from that of any existing optical fibers including silica optical fibers. Our proposed GI POF materials enable quick optical fiber connection for multilevel UHD video transmission, becoming the first “capillaries of light” from optical network terminals in the upcoming IoT era.



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Yasuhiro Koike received his B.S. at Keio University in 1977, M.S., in 1979 and Ph.D. in 1982 in applied chemistry at the Graduate School of Engineering of Keio University. He is Professor at Keio University since 1997 and specialises in “photonics polymer” such as graded-index polymer optical fiber (GIPOF), highly scattered optical transmission (HSOT) polymer, zero birefringence polymer, etc.

He has been pursuing a government project on Face-to-Face Communication system in the FIRST Program of the Cabinet Office of Japan since 2010. He is a recipient of International Engineering and Technology Award of the Society of Plastics Engineers, the Fujiwara Award, and Medal with Purple Ribbon in Palace.