Masataka Nakazawa ／ Professor ／ Research Institute of Electrical Communication

Profile

Prof. Nakazawa was awarded a doctorate in applied electronics by the Tokyo Institute of Technology and then joined the Nippon Telegraph and Telephone (NTT) Public Corporation in 1980. At NTT's Ibaraki and Yokosuka Electrical Communication Laboratories, he engaged in research on optical solitons, ultrahigh-speed optical transmission, erbium-doped fiber amplifiers (EDFA), and ultrashort pulse lasers. He was a Visiting Scientist at Massachusetts Institute of Technology (MIT) in 1984. He became the first NTT R&D Fellow in 1999. In 2001, he was appointed Professor at the Research Institute of Electrical Communication (RIEC), Tohoku University. Currently, he is engaged in research on ultrahigh-speed optical transmission, multi-level coherent optical transmission, and ultrahigh-speed and pulse lasers. He is a Fellow of the Institute of Electrical and Electronic Engineers (IEEE), the Optical Society of America (OSA), and the Institute of Electronics, Information, and Communication Engineers (IEICE) of Japan. He served as the President of the Electronics Society of IEICE in 2006. He has been on the OSA Board of Directors since 2008. He is the author or coauthor of over 370 papers and holds more than 100 patents. He has been honored with many awards, including the 2002 IEEE Daniel E. Noble Award, the 2005 OSA R. W. Wood Prize, and the 2006 Thomson Scientific Laureate.

Research Activities

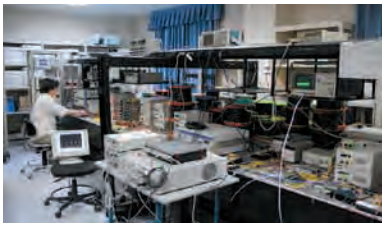
In 1989, Prof. Nakazawa succeeded in achieving a compact and highly reliable erbium-doped fiber amplifier (EDFA) for the first time, by employing a 1.48 μm InGaAsP laser diode as a pump source. He then used the EDFA to make substantial contributions to the advancement of optical transmission technologies.

The terabit wavelength division multiplexed (WDM) optical communication employed today could not have been achieved without this EDFA, and thus his pioneering work is widely recognized as an innovative driving force behind the growth of today's optical communications industry. Furthermore, he proposed a new optical soliton transmission system in which the EDFA is employed as an optical repeater, and succeeded in the first practical soliton transmission, which would have been difficult to achieve without the EDFA. In addition, he applied the EDFA to the development of an ultrashort pulse laser with a repetition rate of 10~40 GHz. He then used this laser to achieve an optical time division multiplexing (OTDM) transmission with ultrashort pulses at a record bit rate of 1.28 Tbit/s. These accomplishments have earned Prof. Nakazawa an enviable reputation throughout the world as a source of progress in optical communication, and they are widely used as fundamental technologies in constructing the next generation of optical communication.

Recently, he has developed a new frequency-stabilized erbium fiber laser operating at 1.54 μ m by using C_2H_2 molecules. With this laser, he is currently investigating a new type of optical coherent transmission with an ultrahigh multiplicity level and ultrahigh spectral efficiency that goes beyond wireless communication.

(a) The first prototype EDFA

(b) Compact, commercial EDFA



(c) Overview of ultrahigh-speed optical transmission experiment

Message

I think that the most important things when carrying out research are to respect the basics and never to stop. You may become depressed and discouraged by failure after failure, especially when you are engaged at the frontier of research, because you are breaking new ground. To keep moving forward in such a difficult situation, it is important for a researcher to have a philosophy or belief as a guiding principle. A new idea or innovative technology comes from just one mind, and eventually grows into a technology supported by research and development performed by many people. In general, a long journey must be undertaken to reach that stage, but a researcher must have the courage and belief to overcome many difficulties along the way.

It is sometimes said that to become professional in any field or job takes more than 10,000 hours (the equivalent of three hours of daily training for ten years). In my opinion, researchers and engineers are no different from artists and sports players. Even if they deal with completely different subjects, they share the same professionalism. The aim is accomplishment at a high level based on originality and creativity. To demonstrate Japan's technical leadership to the world, we must study hard, continuously motivated by professionalism and a pioneering spirit, to propel us ahead of the US and Europe.