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### **From the early universe to the formation of galaxies**

In about 0.38Myr after the Big Bang, the Universe filled with hot plasma and dark matter expanded and cooled down quickly to form neutral hydrogen atoms. This epoch is known as the beginning of the "Dark Age" of the Universe. The initial fluctuation of dark matters grew gravitationally to develop dense enough clouds where the first generation of stars were formed as primordial galaxies. Tremendous pieces of primordial galaxies thus formed are thought to coalesce gradually to form the present day galaxies.

Such a picture of the early history of the Universe drawn from basic physics is now observationally examined by the advent of a modern suite of advanced telescopes. The Subaru Telescope atop Mauna Kea, Hawaii, provided an opportunity to witness many of the young galaxies in the era 800Myr after the Big Bang and shed a light to the era called "Cosmic Dawn" when the ultraviolet light from young galaxies re-ionized the intergalactic neutral hydrogen.

The author attempts to review these findings and reports new development of laser guide star adaptive optics of the Subaru Telescope delivering 10 times higher spatial resolution to advance observational studies of the Universe.

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### **References**

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### **CV**

1977 – 1986	Tenure Research Associate, The University of Tokyo
1986 – 1988	Associate Professor, The University of Tokyo
1988 – 1993	Associate Professor, National Astronomical Observatory of Japan
1993 – Present	Professor, National Astronomical Observatory of Japan