Coherence of a network means that it is made up of functions of entities glued together. In our previous work [Haruna, T., 2013. BioSystems 114, 125-148], we showed that coherence of directed networks can be captured by the lateral path which is dual to the usual directed path. Here, we study propagation of coherence along lateral paths associated with dynamics on random Boolean networks (RBNs). We show that the critical condition for coherence propagation is generally different from that for dynamical criticality by a mean-field theory. An RBN can be dynamically subcritical in parallel with being supercritical for coherence propagation, and vice versa. We discuss the criticality hypothesis of biological networks in terms of our result.

Our technique used a waveguide LN modulator, which could generate novel frequency-domain fluorometry method. The performance in the measurements with near-infrared fluorescent dye was measured to be 0.023±0.004 (SD) at 1 MHz. The present technique is useful to probe the local viscosity around dye and dynamics of rapid rotational motion, it is necessary to precisely measure anisotropy of free rhodamine 6G in water was measured to be $0.023\pm0.004$ (SD) at 1 MHz. The present technique is useful to probe the local viscosity around dye and dynamics of proteins that bind to dye.

The Holliday junction (HJ) is a DNA four-way junction structure and its propagation of coherence along lateral paths associated with dynamics on random Boolean networks (RBNs). We show that the critical condition for coherence propagation is generally different from that for dynamical criticality by a mean-field theory. An RBN can be dynamically subcritical in parallel with being supercritical for coherence propagation, and vice versa. We discuss the criticality hypothesis of biological networks in terms of our result.

A field reprogrammable gate array (FPGA) based photon-timing recorder has been constructed and demonstrated in fluorescence fluctuation measurements to characterize near-infrared fluorescence dye labeled proteins and micelles for in vivo imaging. The new device has a capability to record time-series of photon with a 960MHz sampling time at a maximum (timing-resolution is about 1.0ns with 2-channels) with the cost less than $1,000. The device was used to construct a fluorescence fluctuation measurement system in solution phase, actually an inverted confocal fluorescence microscope with a near-infrared laser diode or a femto-second Ti:Sapphire laser. The performance in the measurements with near-infrared fluorescent dye labeled serum albumin and micelles will be discussed.

The Holliday junction (HJ) is a DNA four-way junction structure and its propagation of coherence along lateral paths associated with dynamics on random Boolean networks (RBNs). We show that the critical condition for coherence propagation is generally different from that for dynamical criticality by a mean-field theory. An RBN can be dynamically subcritical in parallel with being supercritical for coherence propagation, and vice versa. We discuss the criticality hypothesis of biological networks in terms of our result.