Inelastic neutron scattering instrument 4SEASONS at J-PARC

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4SEASONS is one of the inelastic neutron scattering instruments in the pulsed neutron facility in the Japan Proton Accelerator Research Complex (J-PARC) (Fig. 1). It utilizes a Fermi chopper to monochromate the neutron beam generated incident on a sample and a large-area detector system to detect the scattered neutrons as functions of position and time, and analyzes the momentums and energies of excitations in the sample with the time-of-flight technique. The instrument has been developed to perform high-efficiency measurements of weak inelastic signals on novel spin and lattice dynamics in the energy region of $10^0$–$10^2$ meV [1]. The ability to utilize multiple incident-energies simultaneously [2], in addition to the recent improvement in the signal-to-noise ratio, has made 4SEASONS one of the best chopper spectrometers in the world. Since the first user program in late 2008, dynamical studies of superconductors, quantum and frustrated magnets, ferroelectrics etc. have successfully been performed on the instrument. In the presentation, we will show the recent scientific outputs and upgrades of the instrument.

Figure 1: Schematic view of 4SEASONS.