

# Dual Nature of Spin Excitations in Hole-Doped Cuprate

Masaki Fujita<sup>1</sup>

<sup>1</sup>Institute for Materials Research, Tohoku University, Sendai 980-8577, Japan

Origin of characteristic spin excitations in doped Mott insulator is a fascinating issue, since it is relevant to the mechanism of high- $T_c$  superconductivity. To gain a deep insight into the nature of spin excitations, we studied the doping and the thermal evolutions of spin excitations in  $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$  by neutron and resonant inelastic X-ray scattering measurements. From the systematic study, we found the evidence of two energy scales in the hour-glass shaped spin excitations, which is separated by the waist energy. The feature will be discussed in connection with the two spin degrees of freedom, that is, the spins of itinerant and localized electrons.