Anisotropy of the electronic structure in high-T$_c$ cuprates has been studied to understand the origin of the \( d \)-wave superconductivity. In the underdoped region of the hole-doped cuprates, the angle-resolved photoemission (ARPES) spectra around \((\pi,0)\) shows broad feature with a pseudo-gap while that in the node \(((0,0)-(\pi,\pi))\) direction shows relatively sharp peak feature. This broadness in the \((\pi,0)\) spectra has been interpreted as an antiferromagnetic (AF) interaction \[1\]. On the other hand, recent photoemission results have revealed that there is clear break in the energy dispersion in the node direction, so-called “kink” structure, which may be due to the electron-phonon interaction \[2\]. In relation to the “kink” feature, the unconventional behavior of the Fermi velocity in the node direction has been pointed out \[3\].

In order to clarify the anisotropy of the quasi-particle structure caused by these interactions, we will present detailed ARPES study of high-T$_c$ cuprates La$_{2-x}$Sr$_x$CuO$_4$ (LSCO) along the Fermi surface. In the underdoped region, the sharp peak feature is only seen near the node direction with clear “kink” feature at \(~70\text{meV}\) and disappears rapidly away from the node, while the overdoped samples show sharp peak feature in all the direction on the Fermi surface. We will discuss the anisotropy of the spectral line shape seen in the underdoped region in terms of the electron-phonon interaction and the pseudogap behavior.