Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Weak doping dependence of nodal transverse velocity in underdoped cuprates: explanation and significant implications[1] WEI KU, Brookhaven National Laboratory — Recent high resolution angular resolved photoemission spectroscopy has revealed a surprising nearly doping-independent transverse velocity in the nodal region of underdoped cuprates [1,2], in great contrast to the strong doping dependent superconducting transition temperature. This behavior is qualitatively incompatible with standard Bogoliubov quasi-particle picture currently employed in the field, and implies a fundamentally new regime of physics. Here, we will show analytically that this novel behavior follows naturally the recently derived kinetic nature of the quasi-particle gap in the strong binding limit [3]. This realization further confirms the strong pairing nature of the superconductivity and the novel nature of superconducting gap in underdoped cuprates. This study also suggests the crucial need for future experiments in the overdoped regime. [1] PRL 104, 207002 (2010) [2] PNAS 109, 18332 (2012) [3] PRX 1, 011011 (2011)

[1]Work supported by DOE DE-AC02-98CH10886.

Wei Ku
Brookhaven National Laboratory

Date submitted: 09 Nov 2012 Electronic form version 1.4