

# **The hidden gap scale and nodal-antinodal dichotomy in underdoped superconducting cuprates**

**A. Georges**

*Ecole Polytechnique and CNRS, Orsay, France*

Recent electronic Raman scattering experiments performed by M. Le Tacon, A. Sacuto and coworkers (ESPCI, Paris) on hole-doped cuprates in the underdoped regime reveal that nodal and antinodal regions behave in very different manners. I will present the conclusions of a theoretical analysis of these experiments, based on a new sum-rule, and on Fermi liquid and phenomenological considerations, which lead to the conclusion that the superconducting gap function involves a hitherto hidden energy scale, which has the same doping-dependence than the superconducting transition temperature, in contrast to the pseudogap energy scale. The low-frequency Raman response and the temperature-dependence of the superfluid density, both controlled by nodal excitations, are shown to behave in a qualitatively similar manner, which puts strong constraints on microscopic theories of the cuprates.

Reference: *Nature Physics*, 2, 537 (2006); cond-mat/0603392