

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Symmetry-breaking of carbon nanotubes vibrational modes induced by transversal deformations NEWTON M.B. NETO, Universidade Federal de Uberlândia, HELIO CHACHAM, ADO JORIO, SABRINA S. CARARA, JAQUELINE SOARES, Universidade Federal de Minas Gerais, RONALDO J.C. BATISTA, Universidade Federal de Ouro Preto, ERNESTO JOSELEVICH, Weizmann Institute of Science, MILDRED DRESSELHAUS, PAULO ARAUJO, Massachusetts Institute of Technology — In this work we combine an atomic force microscope (AFM) with a setup to perform confocal Raman spectroscopy to follow, *in situ*, the evolution of the G-band feature of a Single Wall Carbon Nanotube (SWNT) with transversal pressure applied to the nanotube via the AFM probe. We observe a previously elusive and fundamental symmetry-breaking effect of the totally symmetric tangential optical TO modes in the G-band feature which exhibits two distinct Raman active modes with an anomalous frequency behavior with increasing applied pressure, while the totally symmetric longitudinal optical LO component remains unaltered. We propose a simple analytical model based on a mass-spring ring system, which satisfactorily explains the main observed effects and shows that the pressure effects change with tube flattening.

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Date submitted: 19 Nov 2011

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