Dimensionality effects on the Raman spectrum of bismuth telluride nanoplatelets

Victor Carozo,[1, *] Bruno R. Carvalho,[2] Syed Hamza Safeer,[3]

Leandro Seixas,[4] Pedro Venezuela,[5] and Mauricio Terrones[6]

[1]*Department of Physics, Pontifical Catholic University of Rio de Janeiro,*

Rio de Janeiro, RJ 22451900, Brazil

[2]*Departamento de Física, Universidade Federal do Rio Grande do Norte,*

Natal, Rio Grande do Norte 59078-970, Brazil

[3]*Department of Physics, Materials Science Lab,*

Quaid-i-Azam University, Islamabad, 45320, Pakistan

[4]*School of Engineering, Mackenzie Presbyterian University,*

Rua da Consolação, 930, São Paulo, SP, 01302-907, Brazil.

[5]*Institute of Physics, Fluminence Federal University, Niteroi, RJ, 24210-346, Brazil*

[6]*Department of Physics and Department of Materials Science and Engineering,*

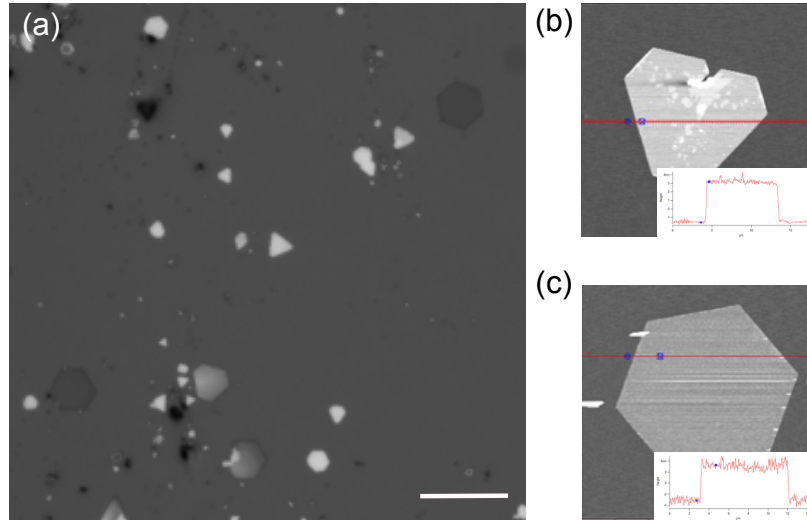*The Pennsylvania State University, University Park, PA 16802, USA.*

Figure S1. (a) Optical microscopy image of Bi_2Te_3 islands. (b) AFM image for 4 QL's, inset the line profile showing the step high of 4 nm (c) AFM topography image of 7 QL's. Scale bar $20\mu m$
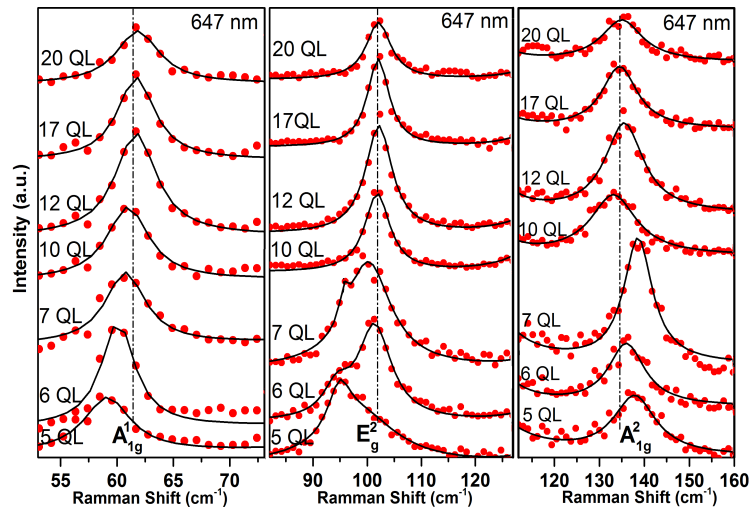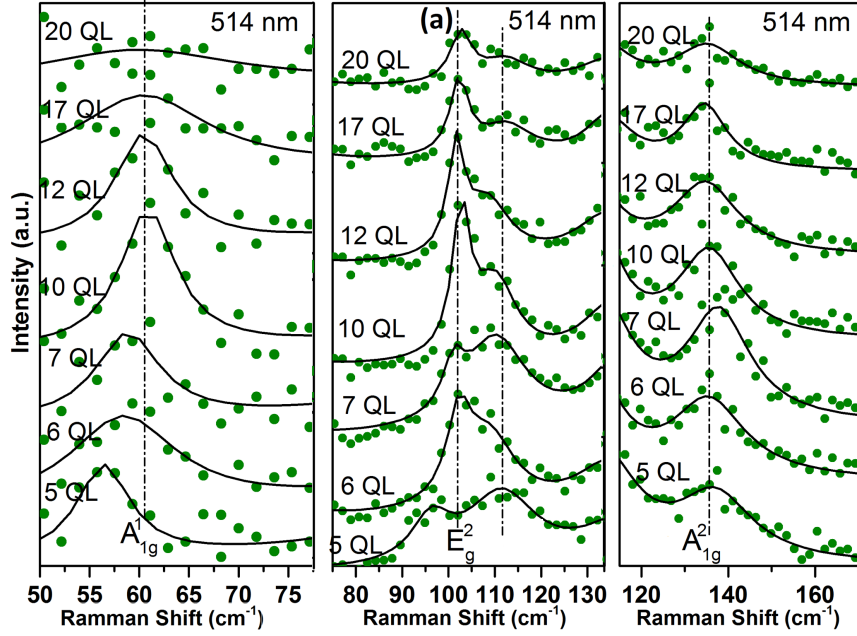

Figure S2. Raman spectra evolution for laser excitation of 1.92 eV. A_{1g}^1, E_g^2, and A_{1g}^2 phonon modes position versus thickness. The black lines are the curve adjusted.

_____

* vcarozo@puc-rio.br

Figure S3. Raman spectra evolution for laser excitation of 2.41 eV. A_{1g}^1, E_g^2, and A_{1g}^2 phonon modes position versus thickness. The black lines are the curve adjusted.
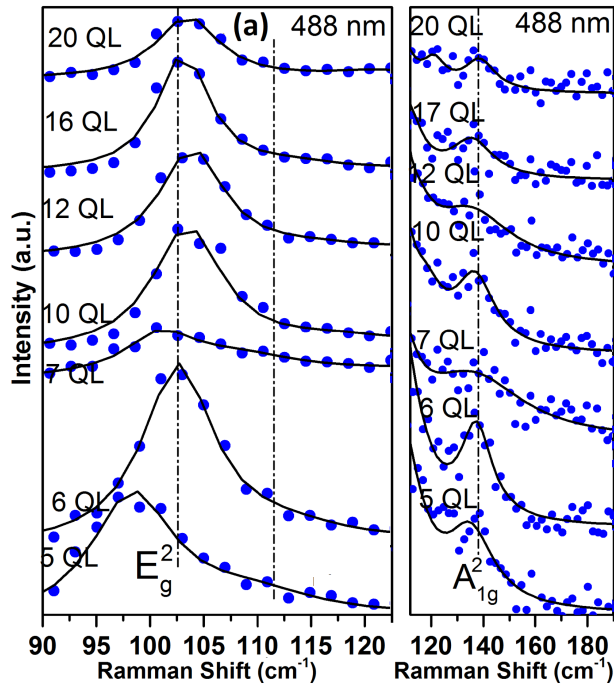

Figure S4. Raman spectra evolution for laser excitation of 2.54. E_g^2, and A_{1g}^2 phonon modes position versus thickness. The black lines are the curve adjusted.
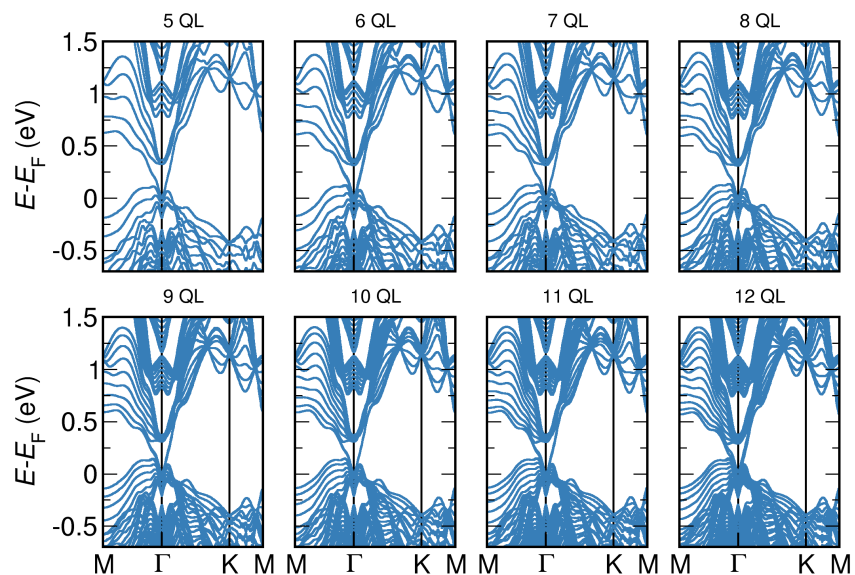
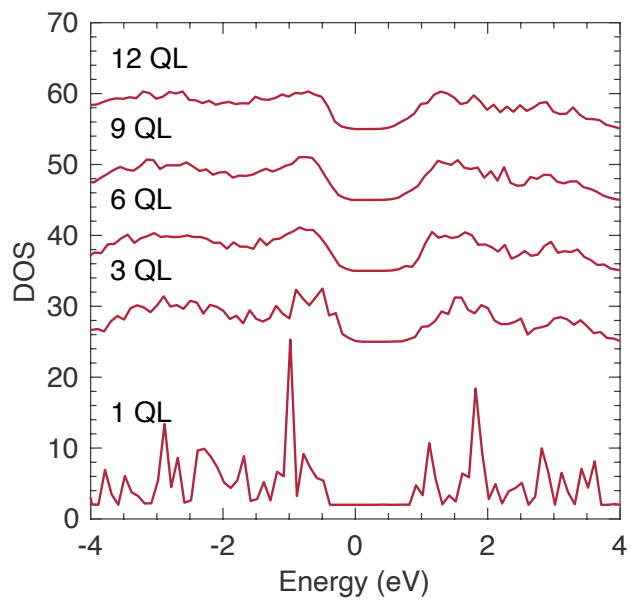Figure S5. DFT calculation of band structure for different QLs.

Figure S6. Calculation of electronic density of states for different QLs.