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Tuning Carbon Nanotube Band Gaps with Strain

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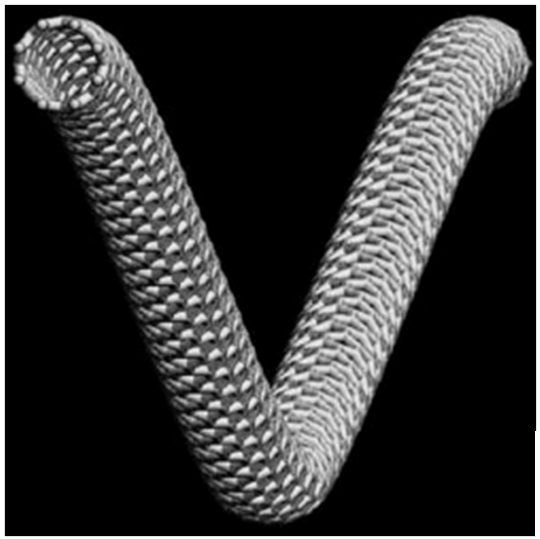
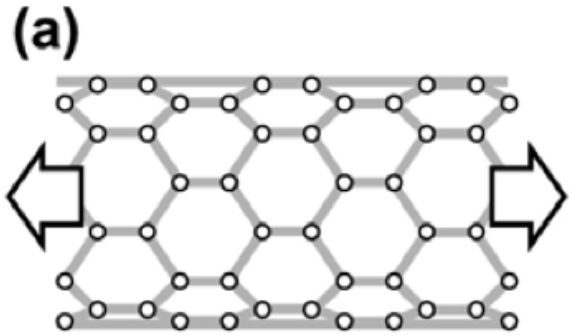


Physical Review Focus

PH427 Journal Club Presentation
Ethan Minot
April 8, 2010

Motivation



Fundamental Physics

• Test theoretical prediction for carbon nanotube strain sensitivity

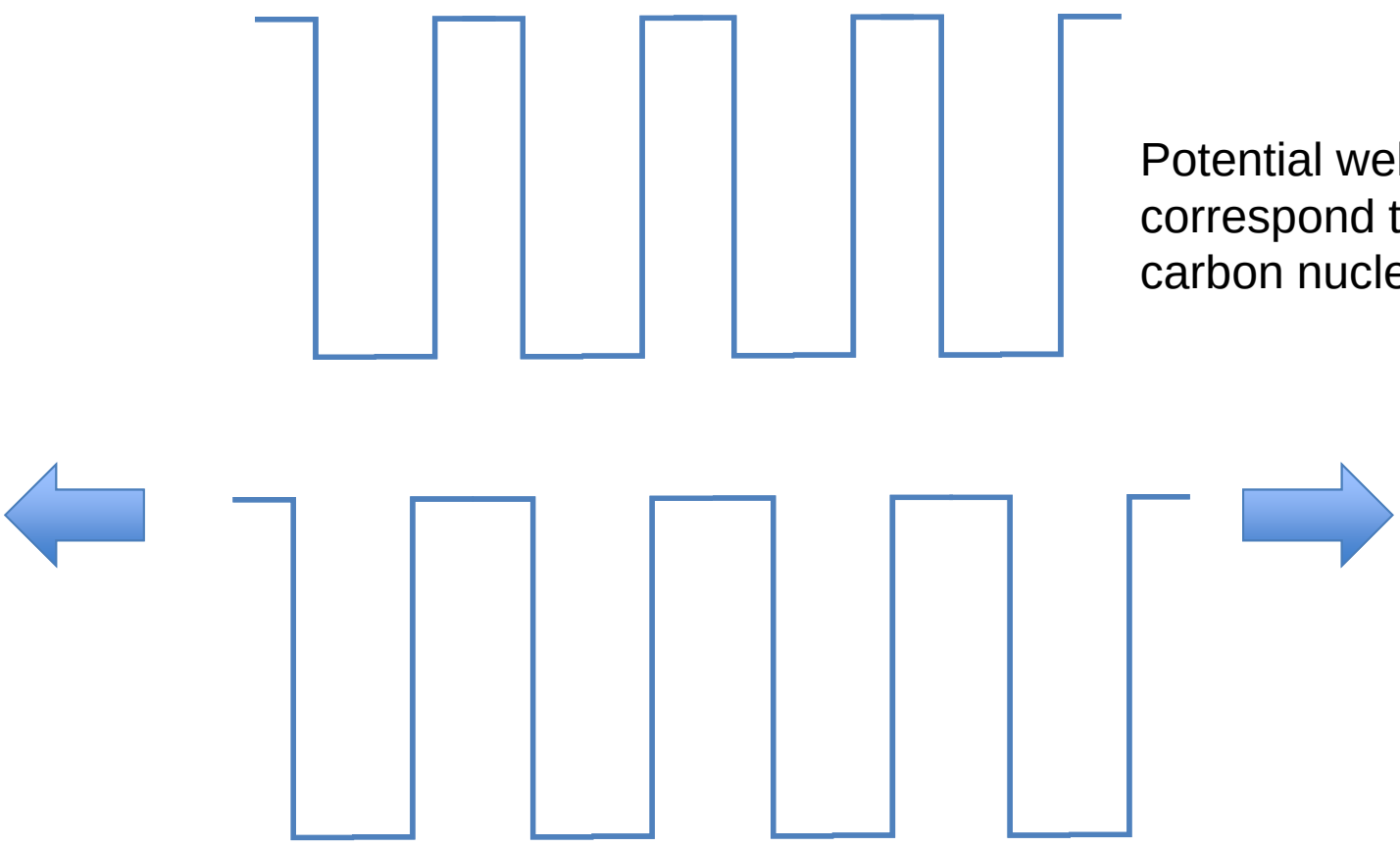
$$\frac{dE_{\text{gap}}}{d\sigma} = \text{sign}(2p + 1)3t_0(1 + \upsilon)\cos 3\phi, \qquad (3)$$

Possible applications

• Bandgap engineering

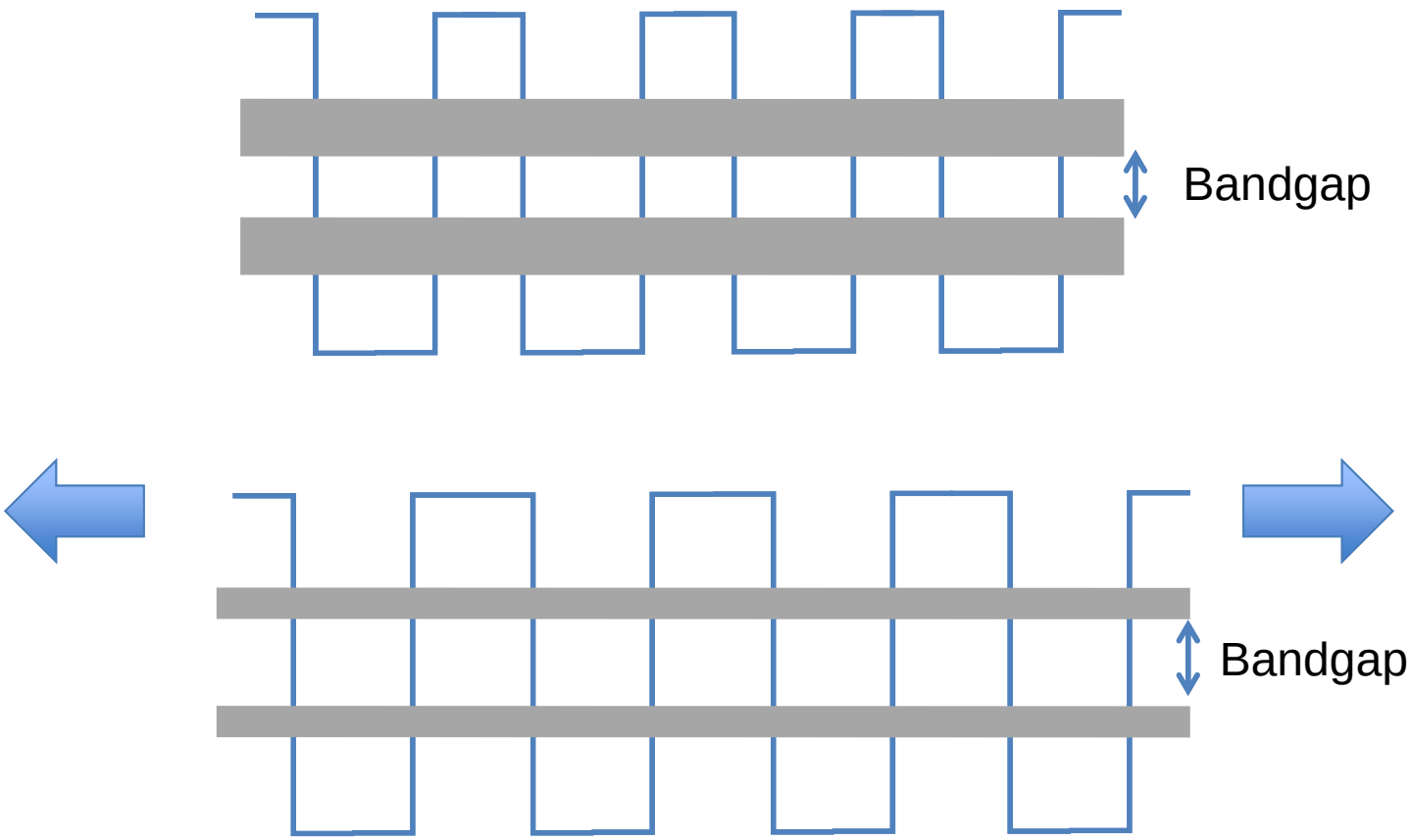
• Better strain transducers

Relationship with class material

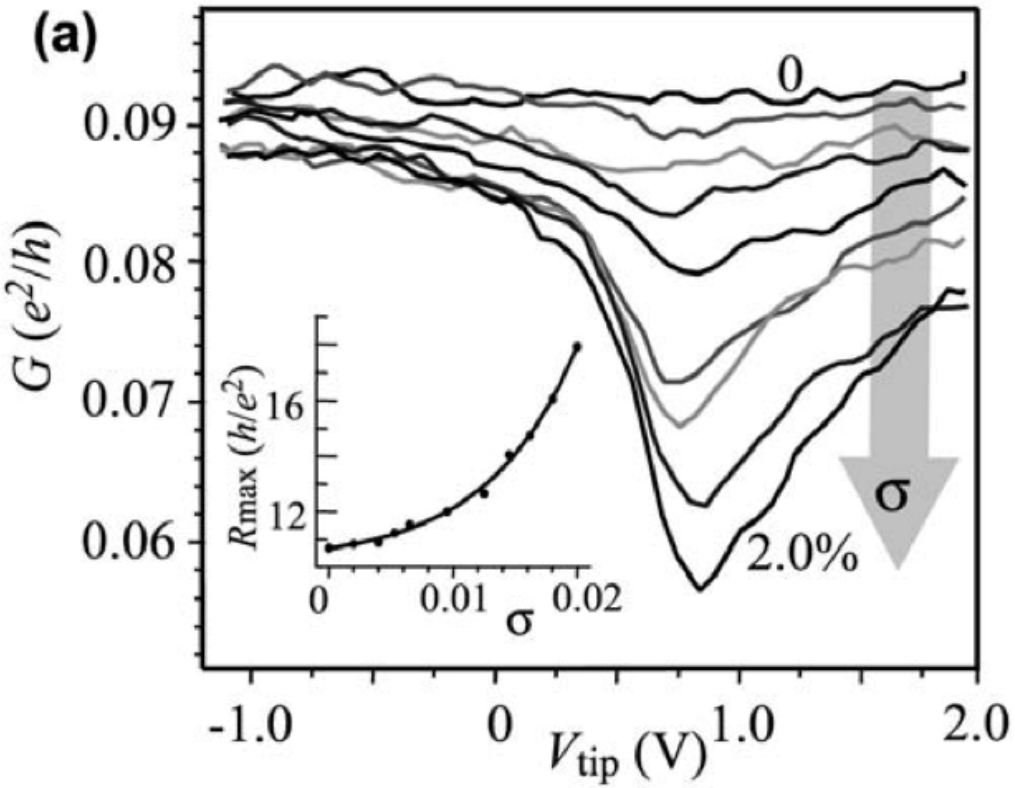


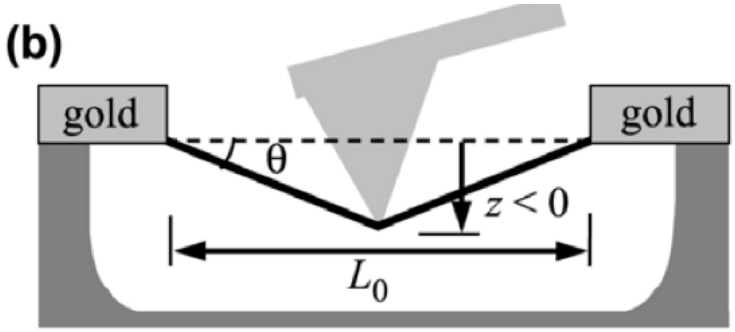
Potential wells correspond to carbon nuclei

Relationship with class material



Result from paper





Conclusions:

- Changes in bandgap were consistent with theory
- Nanotubes make sensitive strain gauges