

Second Laureate Fundamental Research



- **Research Work Title:** Raman spectroscopy as a versatile tool for studying the properties of graphene.
- **Researcher:** Prof. Andrea C. Ferrari
- **Country:** United Kingdom and Italy
- **Field:** Nanotechnology
- **Scientific Affiliation:** University of Cambridge, Cambridge, United Kingdom



Abstract:

Raman spectroscopy is an integral part of graphene research. It is used to determine the number and orientation of layers, the quality and types of edge, and the effects of perturbations, such as electric and magnetic fields, strain, doping, disorder and functional groups. This, in turn, provides insight into all sp² bonded carbon allotropes, because graphene is their fundamental building block. We describe essential physical processes whose importance has only recently been recognized, such as the various types of resonance at play, and the role of quantum interference. We update all basic concepts and notations, and propose a terminology that is able to describe any result in literature. We finally highlight the potential of Raman spectroscopy for layered materials other than graphene

Biography:

Andrea C. Ferrari (ACF) is Professor of Nanotechnology at the University of Cambridge. He is the founding director of the Cambridge Graphene Centre and of the EPSRC Centre for Doctoral Training in Graphene technology. He is the chair of the Management Panel and the Science and Technology Officer of the 1 Billion Euros, EU Graphene flagship, described by the European Commission as “the largest research excellence award in history”. He is a triple ERC grantee, having received ERC synergy, ERC starting, and ERC proof of concept grants. He is a recognised global leader in graphene engineering, having pioneered most of the current streams, from bulk production, through mass scale identification by optical and spectroscopic means, to its implementation in composites, printed and flexible electronics, lasers, photo-detectors, microcavities, plasmonic enhanced structures. He is author of over 330 papers and 220 plenary, keynote and invited talks at every conference in the field. He has >63,000 citations, with an H index of 92, and a current rate of >10,000 citations per year. He was included in the 2016 ,2015 ,2014 Thomson Reuters Highly Cited Researchers' Lists. He received the Royal Society Brian Mercer Award for Innovation, the Marie Curie Excellence Award, the Philip Leverhulme Prize, the Royal Society Wolfson Research Merit Award, the EU40- Materials Prize, a Fellowship of the American Physical Society, a Fellowship of the Institute of Physics, a Fellowship of the Materials Research Society, a Fellowship of the Optical Society, a Cambridge ScD, the Charles E. Pettinos Award of the American Carbon Society, the ACS Nano Award Lectureship, to name a few.