



RAMAN SCATTERING

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SIR C. V. RAMAN

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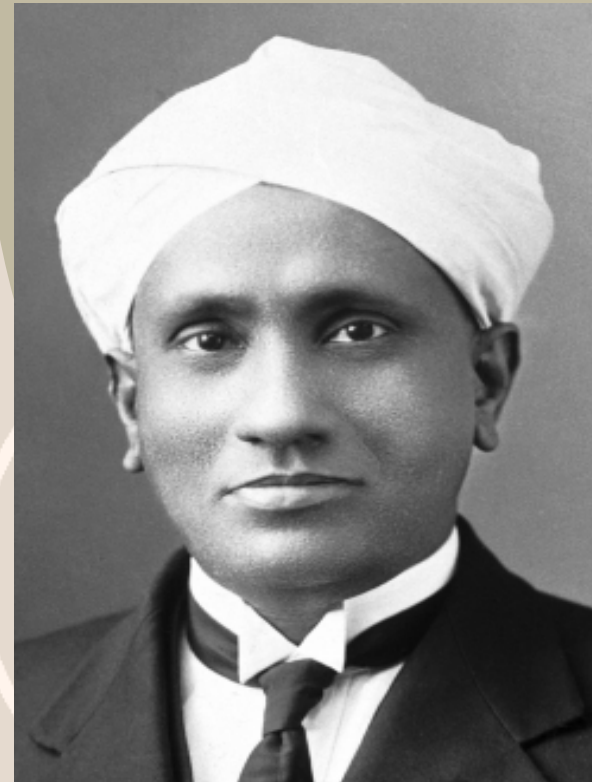
First Asian person to receive a Nobel Prize in Physics. ☐☐

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National Science Day is celebrated in India every year on February 28 to commemorate the discovery of the Raman Effect by Sir C.V. Raman in 1928. ☐☐

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First Indian Director of IISc Bangalore in 1933.



WHY IS SEA BLUE ?



While crossing the mediterranean sea, he was struck by its deep, opalescent blue.

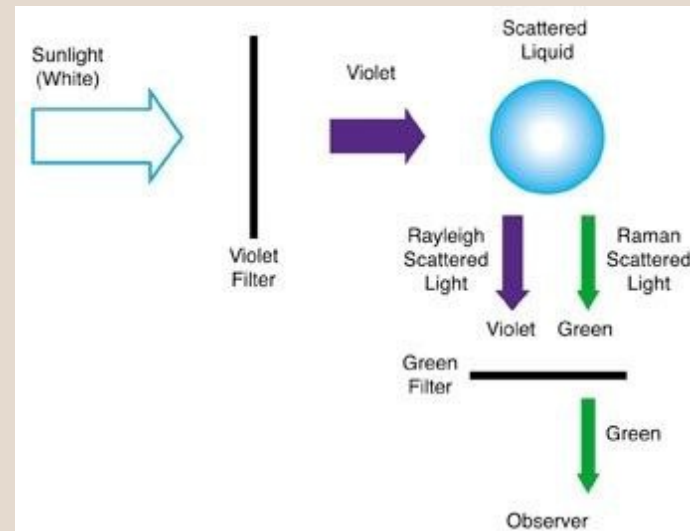
Rayleigh proposed that the sea appeared blue simply because it reflected the color of the sky.

HISTORY BEHIND THIS GREAT DISCOVERY

Rayleigh Scattering -The elastic light scattering phenomena, in which light retains its energy, was described in the 19th century.

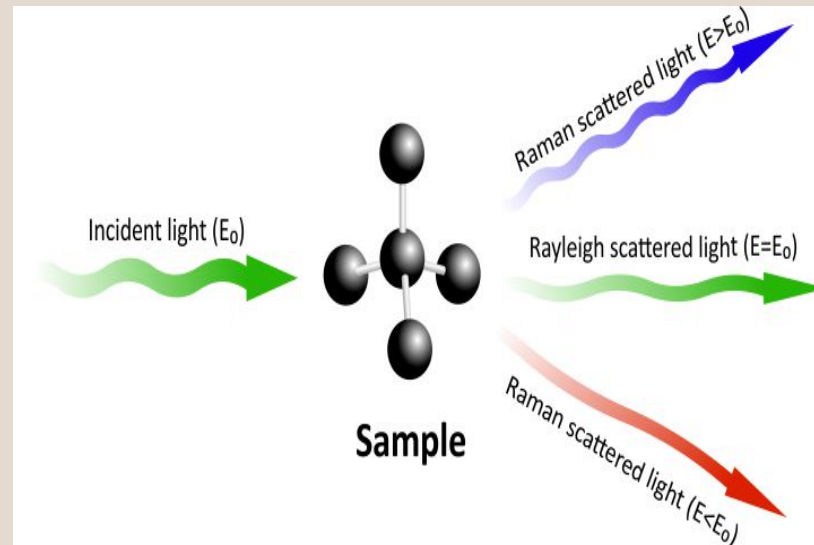
Adolf Smekal prediction of inelastic scattering in 1923.

The Raman effect was first reported by Raman and his coworker K. S. Krishnan.



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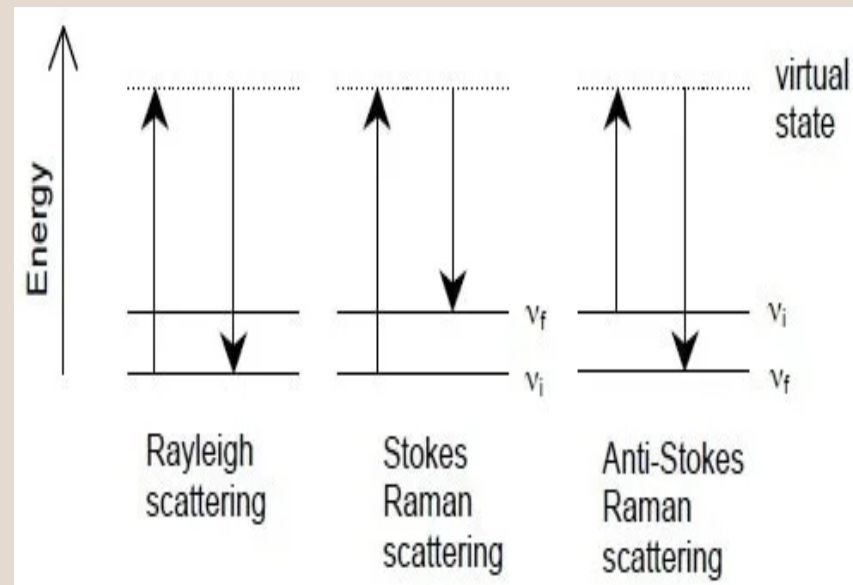
Raman scattering is the "inelastic" scattering of a photon by a molecule.



STOKES AND ANTI STOKES LINE

Stokes line- The incident photon excites the molecule, The scattered photon has less energy, These lines appear at a lower frequency than the incident light.

Anti stokes line- The incident photon gets some energy from the molecule, The scattered photon has more energy, These lines appear at a higher frequency.



Raman scattering occurs when an incident photon interacts with the electron cloud of a molecule, resulting in an exchange of energy.

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The scattered photon emerges with a different frequency ν than the incident light. This difference is known as the Raman Shift.

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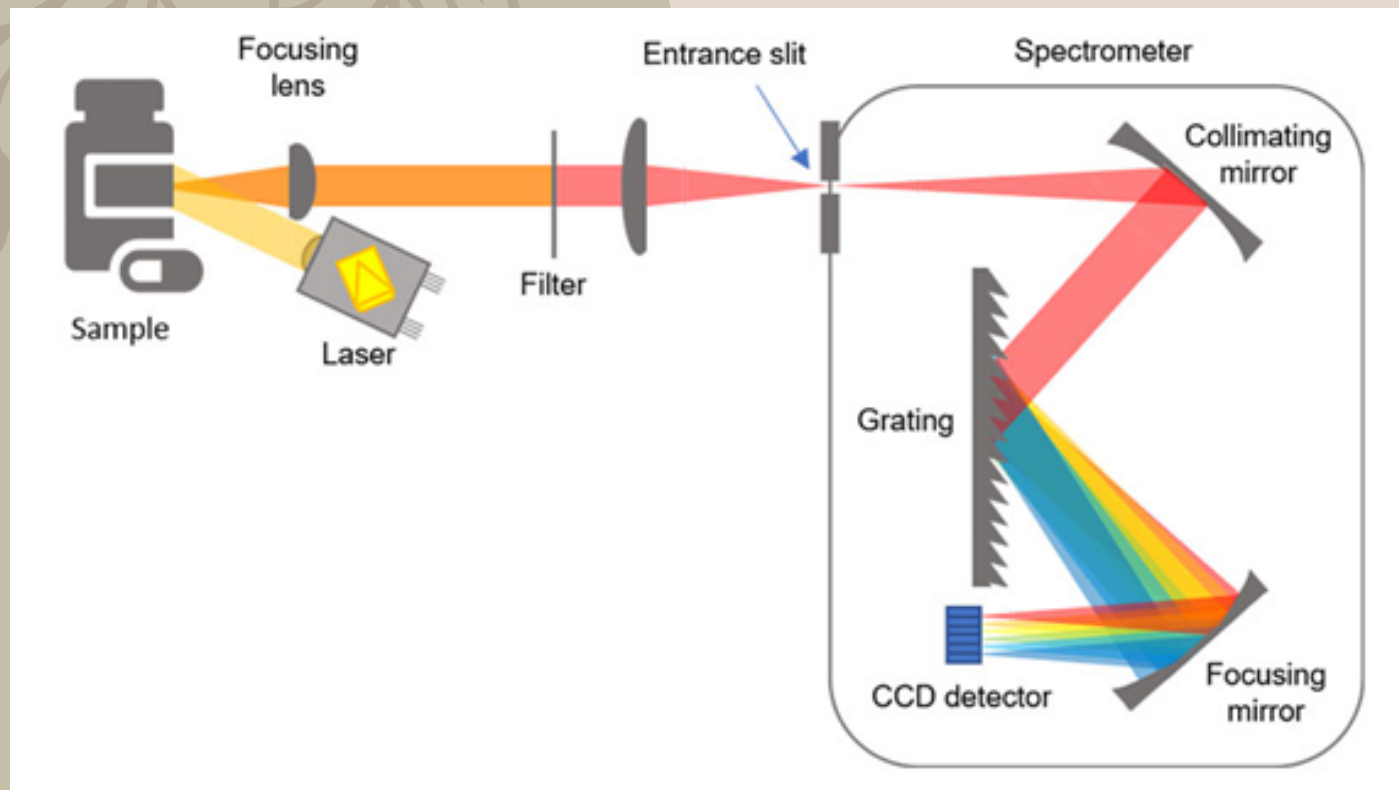
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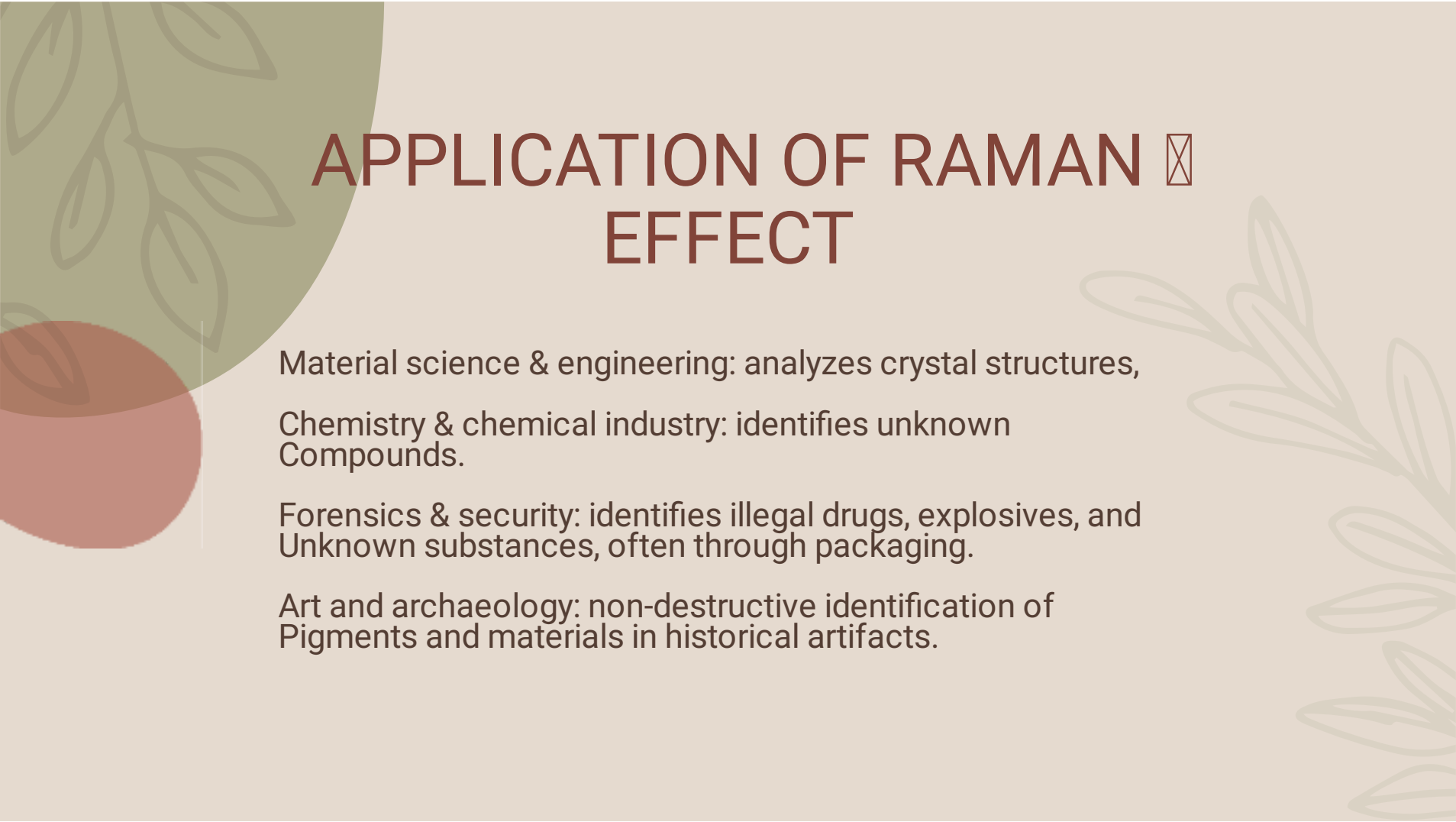
Modern Raman spectroscopy nearly always involves the use of lasers as an exciting light source.

RAMAN SPECTROMETER

MAIN COMPONENTS-

- ❑ Single wavelength line source (laser)
- ❑ Detector
- ❑ Filter
- ❑ Diffraction grating





APPLICATION OF RAMAN EFFECT

Material science & engineering: analyzes crystal structures,

Chemistry & chemical industry: identifies unknown Compounds.

Forensics & security: identifies illegal drugs, explosives, and Unknown substances, often through packaging.

Art and archaeology: non-destructive identification of Pigments and materials in historical artifacts.



Thank You