

Chapter 22

Effective Oscillator Strengths of Tb^{3+} Ions in a Garnet Crystal Determined from Low Temperature Magneto-Optic Rotations

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Abstract In the presentation, I quickly reviewed, from a quantum mechanical perspective, how electric dipole transitions can contribute to the rotation of the plane of polarization of light in a gyrotropic medium. This is called the magneto-optic Faraday effect. This was followed by an investigation of ultra-large Faraday rotations in the garnet single crystal at cryogenic temperatures. A Fourier analysis coupled with Mueller calculus allows one to unambiguously determine the Faraday rotation and ellipticity. Finally, from rotary dispersion data, it is possible to determine the effective oscillator strengths of effective electric dipole transitions.

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