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Microscopic Reversibility Opens Way to Obtain Pure Electronic Transition from Molecular Diffuse Electronic Absorption or Emission Spectrum

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In quantum mechanics transition between elementary quantum states under external perturbation are reversible. For molecular systems such reversibility is probable for electron ensemble. It is shown in the report that relations which are found on the base of microreversibility of vibronic transitions and applied to determine pure electronic transition from diffuse vibronic spectra coincide with the relations given by quantum fluctuation theorem of statistical physics Microreversibility of optical transitions and thermalized started state of transition brings the above named relationships for intensities of vibronic transitions with obvious approximations. Because of approximation the method of pure electron transition (PET) determination was tested on different molecular and condensed state structures, including quantum dots. Homogeneous ensembles of chromophore always provide single clear PET. The considered model gives PET for conditions of spectra registration. Non optically excited luminescence has the same behaviour. The proposed model is applicable for detection of non homogeneity in the case of absence of PET indication.

Biography:

Education - 2012 Doctor of Physics (Optics, Laser Physics), Professor, 1984 Candidate of Science degree in Physics and Mathematics at Institute of Physics of the Academy of sciences of Belarus, 1973-1978 Master degree (with honors) in Physics, Byelorussian State University (Minsk). Professional record - 2015 - present time Head of the Center of photonics of molecular and atomic structures, Institute of Physics, 2000 - 2015 Principal Research Scientist, Institute of Physics, 1991 - 2000 Leading Research Scientist, Institute of Physics, 1988-1991 Senior Staff Research, Institute of Physics, 1978-1988 Staff Research Physicist, Institute of Physics. 270 research publications, 17 patents.