

AN ALGEBRAIC APPROACH TO CALCULATE FRANCK-CONDON FACTORS

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An algebraic approach based on unitary algebras to calculate Franck-Condon factors (FCF's) is presented. The method is based on the unitary group approach, which consists in adding a scalar boson to the ν -D harmonic oscillator space, taking advantage of the transformation brackets connecting the energy, coordinate and momentum representations. In this scheme the solutions are given in terms of an expansion of harmonic oscillator functions. In this way the overlaps are expressed in terms of simple scalar product of the eigenvectors. As a benchmark to illustrate our approach the case of two 1D-Morse potentials is presented. Discussions concerned with both non-Condon contributions and the harmonic limit are included. FCF's involving the 1D-Morse and asymmetric double Morse potentials are also considered. As an application, the FCF's involving the S-S stretching in the S₂O molecule are described in terms of two Morse potentials.