

Selected Abstracts from Other Physical Review Journals

Abstracts of papers that are published in other Physical Review journals and may be of interest to Physical Review A readers are printed below.

Parity-violating effects in asymmetric chemical reactions: A theoretical study on the CHFCIBr molecule Alessandro Soncini, Andrea Ligabue, and Paolo Lazzeretti *Dipartimento di Chimica, Università degli Studi, via G. Campi 183, 41100 Modena, Italy* Riccardo Zanasi *Dipartimento di Chimica, Università degli Studi di Salerno, via S. Allende, 84081 Baronissi (SA), Italy* (Received 31 January 2000; revised manuscript received 8 June 2000)

A coupled Hartree-Fock procedure has been employed to estimate the parity-violating energy contribution due to electroweak interaction in the vicinity of the transition point of a chemical reaction path starting from achiral reagents and producing the chiral CHFCIBr molecule. The calculations demonstrate that (i) the *S* enantiomer is a reaction product more stable than its mirror image by $\approx 1 \times 10^{-17}$ hartree; (ii) in the transition state of the reaction, the chiral activated complex evolving toward the *S*-CHFCIBr species is more stable, by $\approx 2.3 \times 10^{-17}$ hartree, than the enantiomeric activated complex that would yield the *R*-CHFCIBr species. These results suggest that kinetic effects at work during chemical syntheses of chiral molecules might be more significant than the different thermodynamical stability of the two mirror-image reaction products in determining the final configuration and to explain homochirality. [Phys. Rev. E **62**, 8395 (2000)]

Mode structure and ray dynamics of a parabolic dome microcavity Jens U. Nöckel *Max-Planck-Institut für Physik komplexer Systeme, Nöthnitzer Strasse 38, 01187 Dresden, Germany* Guillaume Bourdon, Eric Le Ru, Richard Adams, Isabelle Robert, Jean-Marie Moison, and Izo Abram *Laboratoire CDP CNRS/CNET, 196 Avenue Henri Ravera, F-92220 Bagneux, France* (Received 4 April 2000)

We consider the wave and ray dynamics of an electromagnetic field in a parabolic dome microcavity. The structure of the fundamental *s* wave involves a main lobe in which the electromagnetic field is confined around the focal point in an effective volume of the order of a cubic wavelength, while modes with finite angular momentum have a structure that avoids the focal area and have correspondingly larger effective volumes. The ray dynamics indicate that the fundamental *s* wave is robust with respect to small geometrical deformations of the cavity, while the higher order modes are unstable, giving rise to optical chaos. We discuss the incidence of these results on the modification of the spontaneous emission dynamics of an emitter placed in such a parabolic dome microcavity. [Phys. Rev. E **62**, 8677 (2000)]

Numerical solution of the time-dependent Maxwell's equations for random dielectric media W. Harshawardhan, Q. Su, and R. Grobe *Intense Laser Physics Theory Unit and Department of Physics, Illinois State University, Normal, Illinois 61790-4560* (Received 2 March 2000)

We discuss how a spectral-domain method in combination with a split-operator technique can be used to calculate exact solutions of the time-dependent Maxwell's equations. We apply this technique to study the tunneling signal of an evanescent wave occurring due to frustrated total internal reflection and the propagation of a light pulse through an inhomogeneous medium consisting of multiple random scatterers. [Phys. Rev. E **62**, 8705 (2000)]