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.

Classical theory of resonant transition radiation in multilayer structures B. Pardo and J.-M. André *Laboratoire Charles Fabry de l'Institut d'Optique, CNRS Unité Mixte de Recherche 8501, Centre Universitaire d'Orsay, Boite Postale 147, 91403 Orsay Cedex, FranceLaboratoire de Chimie Physique–Matière et Rayonnement, Université Pierre et Marie Curie, CNRS Unité Mixte de Recherche 7614,11 rue Pierre et Marie Curie, 75231 Paris Cedex 05, France* (Received 15 September 1999; revised manuscript received 22 June 2000; published 27 December 2000)

A rigorous classical electromagnetic theory of the transition radiation in finite and infinite multilayer structures is presented. It makes the standard results of thin-film optics, such as the matrix formalism, accountable; it allows thus an exact treatment of the propagation of the waves induced by the electron. This method is applied to the particular case of the periodic structures to treat the resonant transition radiation (RTR). It is noted that the present theory gives, in the hard x-ray domain, results previously published. The reason for this approach is to make the numerical calculations rigorous and easy. The numerical results of our theory are compared to experimental RTR data obtained recently by Yamada *et al.* [Phys. Rev. A **59**, 3673 (1999)] with a nickel-carbon multilayer structure. [Phys. Rev. E **63**, 016613 (2001)]

Classical phase space and statistical mechanics of identical particles T. H. Hansson, S. B. Isakov, J. M. Leinaas, U. Lindström *Department of Physics, University of Stockholm, P.O. Box 6730, S-11385 Stockholm, Sweden Department of Physics, University of Oslo, P.O. Box 1048, Blindern, N-0316 Oslo, Norway* (Received 24 May 2000; published 17 January 2001)

Starting from the quantum theory of identical particles, we show how to define a classical mechanics that retains information about the quantum statistics. We consider two examples of relevance for the quantum Hall effect: identical particles in the lowest Landau level, and vortices in the Chern-Simons Ginzburg-Landau model. In both cases the resulting *classical* statistical mechanics is shown to be a nontrivial classical limit of Haldane's exclusion statistics. [Phys. Rev. E **63**, 026102 (2001)]

Stimulated transitions between the self-trapped states of the nonlinear Schrödinger equation P. V. Elyutin A. N. Rogovenko *Department of Physics, Moscow State University, Moscow 119899, Russia* (Received 23 December 1999; published 25 January 2001)

We investigate a particle confined within a double-well potential, its behavior described by a one-dimensional nonlinear Schrödinger equation. Transitions between the two lowest self-trapped states of this system are studied, in the two-mode approximation, under the influence of the external time-dependent perturbation. If the perturbation is harmonic in time, with the frequency ω, then transitions between the states become possible if the amplitude of the perturbation F exceeds some threshold value $F_c(\omega)$; above this threshold motion of the system becomes chaotic. If the perturbation is broadband noise, then transitions between the states are possible at arbitrarily small F and occur in the process of the system's energy diffusion. [Phys. Rev. E **63**, 026610 (2001)]

Propagation of photons in resting and moving media J. Zaleśny *Institute of Physics, Technical University of Szczecin, Al. Piastów 48, 70-310 Szczecin, Poland* (Received 12 May 2000; revised manuscript received 11 September 2000; published 12 January 2001)

The propagation of photon in a dielectric may be described with the help of the scalar and vector potentials of the medium. The main novelty of the paper is that the concept of the vector potential (which is connected with the velocity of the medium) can be extended to relativistic velocities of the medium. The position-dependent photon wave function was used to describe the propagation of the photon. The new concepts of the velocity of photon as particle and the photon mass in the dielectric medium were proposed. [Phys. Rev. E **63**, 026603 (2001)]

Soliton scattering from a finite cnoidal wave train in a fiber H. J. Shin *Department of Physics and Research Institute of Basic Sciences, Kyunghee University, Seoul 130-701, Korea* (Received 17 August 2000; published 22 January 2001)

We analyze the scattering of a soliton from a cnoidal wave train in a fiber theoretically as well as numerically. Solitons recover their original shapes and velocities after collisions, while shapes of cnoidal waves are nearly preserved during collisions. The effect of collisions is described by the change of velocities of solitons, and the theoretical predictions are in good agreement with numerical results. [Phys. Rev. E **63**, 026606 (2001)]