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 E readers are printed below.

Renormalization-group approach to the problem of light-beam self-focusing V. F. Kovalev *Institute for Mathematical Modelling, Russian Academy of Science, Moscow 125047, Russia* V. Yu. Bychenkov *P. N. Lebedev Physics Institute, Russian Academy of Science, Moscow 117924, Russia* V. T. Tikhonchuk *Department of Physics, University of Alberta, Edmonton, Canada T6G 2J1* (Received 26 May 1999; published 14 February 2000)

A method of renormalization-group symmetries is applied for analytical solution to the nonlinear Schrödinger equation which describes the electromagnetic beam self-focusing in a medium with a cubic nonlinearity. The boundary-value problem for the incident Gaussian light beam has been solved analytically in a cylindrical geometry although the method could be applied to other boundary conditions too. The solution describes a detailed structure of wave self-focusing and its global characteristics such as the light power trapped in the singularity, laser beam radius, and self-focusing length. A comparison with the results of previous studies demonstrates advantages of the renormalization-group symmetry method as a tool for the nonlinear electrodynamics theory. [S1050-2947(00)09402-6]

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