process. We propose a forward-backward asymmetry in the production of π and η mesons as a signal for the hybrid meson production. We briefly comment on hybrid electroproduction at very high energy, in the diffractive limit where a QCD Odderon exchange mechanism should dominate. The conclusion of our study is that hard electroproduction is a promissing way to study exotic hybrid mesons, in particular at JLAB, HERA (HERMES) or CERN (Compass) [1].

[1] As above Phys. Rev. D71 (2005) 034021

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8.20 Hadron Annihilation Into two Photons and Backward VCS in the Scaling Regime of QCD

by B.Pire[1] and L.Szymanowski

We study the scaling regime of hadron-(anti)-hadron annihilation into a deeply virtual photon and a real photon, H *anti-*$H \to \gamma^* \gamma$, and deep backward virtual Compton scattering, $\gamma^* H \to H \gamma$. We advocate that there is a kinematical region where the scattering amplitude factorizes into a short-distance matrix element and a long-distance dominated object: transition distribution amplitude which describes the hadron to photon transition [1].

[1] As above Phys. Rev. D 71 (2005) 111501, arXiv:hep-ph/0411387

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8.21 Effective Methods for Solving Shrödinger Like Ordinary Differential Equations

by A.A.Skorupski and E.Infeld

An effective method was developed for solving the eigenvalue problem for two coupled Shrödinger like differential equations. The results were applied to equations describing small vibrations of a linear vortex in a Bose-Einstein condensate in the long wavelength limit. The numerical calculation based on this theory extended results obtained earlier [1, 2]. Some theoretical predictions given in [1] were confirmed.

[1] E.Infeld and A.A.Skorupski, J. Phys.: Condens. Matter, vol. 14 (2002) 13717
[2] A.A.Skorupski and E.Infeld, Eigenvalue problem for a set of coupled Schrödinger like ODEs, App. Num. Anal. Comp. Math. vol. 2, 167(2005)

8.22 A Method for Obtaining Exact Solutions of the Nonlinear Schrödinger Equation for Double Square Well Potential

by P.Ziń[1], E.Infeld, M.Matuszewski[1], G.Rowlands[2] and M.Trippenbach

Both symmetric and symmetry breaking analytic solutions to the one dimensional nonlinear Schrödinger equation with a double square well potential are known, but not straightforward to obtain numerically. The former generalize solutions to the linear equations, the latter owe their very existence to the nonlinearity. These include, for example, solutions corresponding to the wave-function localized almost entirely in one of the wells. Here we propose a systematic method for generating these solutions starting from the linear limit. In particular we find a simple exact formula giving the bifurcation point in terms of the parameters of the symmetric solution. This bifurcation point is then reproduced to a surprising degree of accuracy by a simple variational method [1].

[1] P.Ziń et al., Phys. Rev. A 73 (2005) 022105

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