

Peer Review

Review of: "Multidimensional Soliton Systems: an Update"

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The manuscript "**Multidimensional Soliton Systems: an Update**" is a timely, concise, and highly valuable contribution with schematics and figures. It offers a clear and easily understandable overview of the most recent developments in the rapidly evolving field of multidimensional solitons, quantum droplets, and nonlinear wave structures in both optics and BE condensates. The author has successfully bridged the gap between his earlier comprehensive review (in Taylor and Francis ["Multidimensional Soliton Systems." Adv Phys X. 9(1):2301592.] which I read in relation to this article) and the significant advancements reported in the past two years, making this update exceptionally relevant. The manuscript is well-structured and written with clarity, allowing readers from diverse backgrounds to easily grasp the complex physics involved. It covers a remarkable breadth of topics, including the dynamical formation of multiple quantum droplets, observation of expanding toroidal light pulses, theoretical progress in fractional diffraction systems, stable anisotropic vortex droplets, and high-topological-charge solitons in Rydberg-dressed BECs. The inclusion of new research directions such as **PINN-based soliton modeling and solitons** on Möbius-strip geometries (which I appreciate from the core of my heart) further enhances the novelty of the work. The technical descriptions are, in my opinion, accurate; the models are presented with utmost precision when compared to other works in recent days, and the discussion remains balanced and informative. The references are comprehensive and up to date, reflecting the author's deep engagement with current literature. Overall, this update synthesizes cutting-edge findings. It also provides valuable insight into emerging trends and open challenges. It will be helpful for plasma physicists. It is poised to serve as an important and widely cited reference for researchers in nonlinear optics, quantum gases, plasma waves, and related areas. Therefore, I **strongly recommend acceptance** of the manuscript.

Declarations

Potential competing interests: No potential competing interests to declare.