Review of: "Spin-statistics Theorem from the Stuart-Landau Equation"

Thomas Dittrich[1]

1 Universidad Nacional de Colombia

Potential competing interests: No potential competing interests to declare.

In elementary particle physics, involving structures borrowed from nonlinear dynamics to interpret certain phenomena and particle features has a good tradition. A paradigm is the particle-like behaviour of solutions of Klein-Gordon equation, known as solitons. In this paper, following a similar strategy, the authors refer to a Hopf bifurcation as a model for the separation of fermionic and bosonic statistics in Quantum Field Theory. They pretend demonstrating that the two stable fixed points the Stuart-Landau equation possesses in a certain parameter region correspond to the two branches of spin statistics.

This looks like an appealing and promising idea, but the way it is elaborated in this paper, it will hardly convince anyone. This is no more than a stump: It lacks introduction and conclusion, and even the nucleus of the reasoning remains incomprehensible. Essential input, such as the Stuart-Landau equation, is not quoted explicitly, part of the symbols are not defined, for instance the central parameters \mu and \omega_0, and essential concepts such as canonical dimension are not explained. More specifically, I did not find arguments how quantities how QFT quantities are to be related to the general parameters of the Stuart-Landau equation. Readers niot firmly based in QFT and the Standard Model will not be able to follow the derivation. A comprehensive bibliography might help. However, restricted to a list of links, it is insufficient, since authors and titles cannot be seen in plain text. Moreover, the author cites essentially his own publications, suitable review articles are missing.

To be shure, the author warns in an "cautionary remark" that this

paper is to be considered as a mere draft. However, with or without this caveat, I do not see why work half done deserves being published in an international journal, let alone in a platform of a cross-disciplinary profile as is Queios. Should the intention be preserving priority for the basic idea, that would lead to an arms race favouring the publication of increasingly immature work. That cannot be desirable.

Working out this material up to the level of a fully-fledged research paper, to be submitted to a journal dedicated to, say, high-energy physics, such as Physical Review D, therefore appears more appropriate.