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Quantum corrections to binding energies of BPS vortices

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Non-linear field theories often possess so-called soliton solutions that have localized energy densities and that are characterized by topological charges. Quantum corrections to the total energy may be decisive for the stability of solitons with higher charges. To explore this stability I will consider vortices in scalar electrodynamics which is one of the rare renormalizable models that contain soliton type solutions with different topological charges. Especially the BPS case is interesting because then the classical energy is proportional to the charge. Then the binding energies of the higher charge vortices vanish and the quantum corrections decide on whether or not they are stable. Within the on-shell renormalization scheme the energetically favorable scenario turns out to be that in which vortices coalesce rather than to appear in isolation [1].

[1] N. Graham and H. Weigel, Phys. Rev., D104 (2021) L011901; D106 (2022) 076013.

Is this abstract from experiment?

No

Name of experiment and experimental site

n/a

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

Yes

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