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Geometry and topology of finite-gap vortex filaments. (English) [Zbl 1132.53005](#)

Mladenov, Ivaïlo (ed.) et al., Proceedings of the 7th international conference on geometry, integrability and quantization, Sts. Constantine and Elena, Bulgaria, June 2–10, 2005. Sofia: Bulgarian Academy of Sciences (ISBN 954-8495-30-9/pbk). 187-202 (2006).

The paper surveys the authors joint work with A. Calini on the geometry and topology of closed curves in \mathbb{R}^3 whose spectral genus is finite. These are the finite gap solutions to the vortex filament equation introduced by da Rios which, as discovered by Hasimoto, is a geometric realization of the nonlinear Schrödinger equation. The author discusses the relation between the spectral curve of the underlying integrable system and the geometry and topology of the vortex filament, in particular the characterization of spectral curves of periodic vortex filaments given by Grinevich-Schmidt. In the last section he gives examples of isoperiodic Whitham deformations of vortex filaments induced by deformations of spectra which preserve the condition that the filament is periodic.

For the entire collection see [\[Zbl 1089.53004\]](#).

Reviewer: [Christoph Bohle \(Berlin\)](#)

MSC:

- [53A04](#) Curves in Euclidean and related spaces
- [35Q51](#) Soliton equations
- [35Q55](#) NLS equations (nonlinear Schrödinger equations)

Keywords:

[spectral genus](#); [nonlinear Schrödinger equation](#)