

Axisymmetric solitary waves on the surface of a ferrofluid

Elise Bourdin (MSC), Jean-Claude Bacri (MSC), Eric Falcon (MSC)

(Submitted on 3 Feb 2010)

We report the first observation of axisymmetric solitary waves on the surface of a cylindrical magnetic fluid layer surrounding a current-carrying metallic tube. According to the ratio between the magnetic and capillary forces, both elevation and depression solitary waves are observed with profiles in good agreement with theoretical predictions based on the magnetic analogue of the Korteweg-deVries equation. We also report the first measurements of the velocity and the dispersion relation of axisymmetric linear waves propagating on the cylindrical ferrofluid layer that are found in good agreement with theoretical predictions.

Comments: to be published in Phys. Rev. Lett

Subjects: **Fluid Dynamics (physics.flu-dyn)**; Other Condensed Matter (cond-mat.other); Pattern Formation and Solitons (nlin.PS); Classical Physics (physics.class-ph)

Cite as: [arXiv:1002.0736v1](https://arxiv.org/abs/1002.0736v1) [physics.flu-dyn]

Submission history

From: Eric Falcon [[view email](#)] [via CCSD proxy]

[v1] Wed, 3 Feb 2010 13:32:59 GMT (419kb)

[Which authors of this paper are endorsers?](#)

Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

Current browse context:

[physics.flu-dyn](#)

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1002](#)

Change to browse by:

[cond-mat](#)

[cond-mat.other](#)

[nlin](#)

[nlin.PS](#)

[physics](#)

[physics.class-ph](#)

References & Citations

- [CiteBase](#)

Bookmark (what is this?)

[CiteULike logo](#)

[Connotea logo](#)

[BibSonomy logo](#)

[Mendeley logo](#)

[Facebook logo](#)

[del.icio.us logo](#)

[Digg logo](#)

[Reddit logo](#)