Cornell University Library

We gratefully acknowledge support from the Simons Foundation and member institutions

arXiv.org > cond-mat > arXiv:1106.3946

Search or Article-id

(Help | Advanced search)

All papers   Go!

Condensed Matter > Superconductivity

Electrodynamics of Abrikosov vortices: the Field Theoretical Formulation

A.J. Beekman, J. Zaanen

(Submitted on 20 Jun 2011)

Electrodynamic phenomena related to vortices in superconductors have been studied since their prediction by Abrikosov, and seem to hold no fundamental mysteries. However, most of the effects are treated separately, with no guiding principle. We demonstrate that the relativistic vortex worldsheet in spacetime is the object that naturally conveys all electric and magnetic information, for which we obtain simple and concise equations. Breaking Lorentz invariance leads to down-to-earth Abrikosov vortices, and special limits of these equations include for instance dynamic Meissner screening and the AC Josephson relation. On a deeper level, we explore the electrodynamics of two-form sources in the absence of electric monopoles, in which the electromagnetic field strength itself acquires the characteristics of a gauge field. This novel framework leaves room for unexpected surprises.

Submission history

From: Aron Beekman [view email]

[v1] Mon, 20 Jun 2011 15:39:21 GMT (78kb)

Which authors of this paper are endorsers?

Download:

- PDF
- PostScript
- Other formats

Current browse context:

cond-mat.supr-con

< prev | **next >**

new | recent | 1106

Change to browse by:

cond-mat
math
math-ph

References & Citations

- NASA ADS

Bookmark(what is this?)