Magnetic hose: Routing and Long-distance Transportation of Magnetic Fields

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http://arxiv.org/abs/1304.6300 [2]

Magnetism is a fundamental interaction shaping our physical world, at the basis of technologies such as magnetic recording or energy generation. Unlike electromagnetic waves, which can be routed and transmitted with waveguides to long distances, magnetic fields rapidly decay with distance. Here we present the concept, design, and properties of a magnetic hose which enables to transfer the static magnetic field generated by a source to an arbitrary distance, and along any given trajectory. We experimentally demonstrate the field transmission through the simplest hose realization using a superconducting shell with a magnetic core. We discuss possible application of magnetic hoses to harness quantum systems by addressable magnetic fields, in the context of quantum information processing.

- 41.90.+n New sensor technologies [3]
- 41.95.+m Quantum magnetometry [4]
- AQUTE [5]
- Result [6]

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[6] http://qurope.eu/category/attribute/result