Abstract Submitted
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Electromotive force and current induced by a bar magnet and a monopole LIANXI MA, blinn college — The magnetic flux Φ_B, electromotive force, EMF, and current I_{in}, induced by a moving magnetic bar and an imaginary magnetic monopole in a superconducting loop of one turn, are numerically calculated. The magnetic field of the bar magnet is approximated with the magnetic field along z axis of a solenoid with length l and radius a with current I, while the magnetic field of the monopole is supposed to be inversely proportional to r^2. Calculations show that, for a bar magnet, Φ_B and I_{in} reach the maximum when the bar is at the center of the superconducting loop, but sign of EMF changes. The calculation doesn't contradict our experiment results which show that I_{in} switches sign as EMF does since in the laboratory the loop is not superconducting. For a magnetic monopole, Φ_B is discontinuous (from positive maximum to negative maximum) when the bar moves through the center of the superconducting loop, so the there is a delta function in EMF in addition to EMF induced by the a moving monopole. The current I_{in} is continuous at this moment and continues to grow while the monopole leaves the loop. The calculations about the monopole agree with published results.

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