

Dynamics of slender monopoles and anti-monopoles in non-Abelian superconductor

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Low energy dynamics of magnetic monopoles and anti-monopoles in the $U(2)_C$ gauge theory is studied in the Higgs (non-Abelian superconducting) phase. The monopoles in this superconducting phase are not spherical but are of slender ellipsoids which are pierced by a vortex string. We investigate scattering of the slender monopole and anti-monopole, and find that they do not always decay into radiation, contrary to our naive intuition. They can repel, make bound states (magnetic mesons) or resonances. Analytical solutions including any number of monopoles and anti-monopoles are obtained in the first non-trivial order of rigid-body approximation. We point out that some part of solutions of slender monopole system in $3+1$ dimensions can be mapped exactly onto the sine-Gordon system in $1+1$ dimensions. This observation allows us to visualise dynamics of monopole and anti-monopole scattering easily.