

# Vortex-vortex interactions in toroidally trapped Bose-Einstein condensates

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We analyze the vortex dynamics and vortex–vortex interactions in Bose-Einstein condensates confined in toroidal traps. We show that this particular geometry strongly distorts the vortex dynamics. The numerically calculated vortex trajectories are well explained by an analytical calculation based on the image method and conformal mapping. We analyze in detail the effects of the geometry for toroidal box potentials, as well as those produced by the smooth transversal confinement. Finally, the dissipation effects are discussed.

[1] J.-P. Martikainen, K.-A. Suominen, L. Santos, T. Schulte and A. Sanpera, *Phys. Rev. A* **64**, 063602 (2001).

[2] T. Schulte, L. Santos, A. Sanpera and M. Lewenstein, *cond-mat/0202481* (2002).