

# On quark confinement by the Particle Mesh Ewald's method

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## Abstract

In this research, we study quark confinement by dyons as the vacuum structures of QCD theory and apply the particle mesh Ewald's (PME) method – the generalization of Ewald's method-on non-interacting and interacting ensembles of dyons. As the result, we represent the linear functionality of the free energy of the quark-antiquark pair versus their separation in both non-interacting and interacting simulations near the deconfinement temperature. We also show that adding the interaction of dyons to the system increases the string tension and decreases the temperature of the system. In other words, dyonic interaction increases the gluonic field strength.

**Keywords:** Quark confinement, Calorons, dyons, Ewald's method, Particle mesh Ewald's method

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