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Complete Monopole Dominance of the Static Quark Potential

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In earlier work, we used a gauge independent Abelian Decomposition to show that Abelian degrees of freedom were wholly responsible for the static quark potential. The Abelian decomposition contains a Maxwell part and Topological part, whose contribution to the string tension can be analysed theoretically and numerically, and arises because of the existence of a certain type of monopole. If we also fix the gauge in a certain way, we show that the Topological part can wholly account for the string tension. We show using numerical simulations in $SU(2)$ Yang-Mills theory that the monopoles which can at least partially explain confinement are present in the QCD vacuum.

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