The Influence of Instantons on the Quark Propagator in Lattice Quantum Chromodynamics

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January 2012

A thesis submitted for the degree of Master of Philosophy of the University of Adelaide

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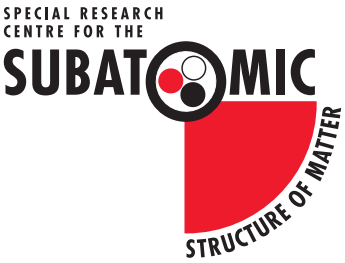

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Acknowledgements

I'd like to thank my supervisors, Derek Leinweber and Waseem Kamleh, without whose endless patience and advice this thesis would never have happened. I'd also like to thank my family, Hayley and my friends for supporting me for the last two years and dealing stoically with sometimes odd hours and complaints about odder problems.

I could never have lasted two years without conversations both informative and entertaining with my office mates, Adrian, Ben, Nathan, Sam, Sophie and Phiala, who have taught me everything from the finer points of physics to the correct classification of fruits and vegetables.

Those who read parts or all of my thesis helped immensely to make it a far more readable and cogent document than it would otherwise be, and so thanks to Adrian, Andrew, Ben, Brendan and Hayley. Finally I'd like to thank those who either have not been mentioned here at all, or are annoyed they have not been thanked enough. They helped most of all.

Abstract

The non-Abelian nature of quantum chromodynamics means the vacuum cannot be treated as devoid of structure. The non-trivial topology of the vacuum is manifested through instantons, which have important effects on chiral symmetry breaking and dynamical mass generation. We wish to discern the presence and import of instantons on the lattice, first by using the technique of smearing to create lattice configurations which consist solely of instanton-like objects, then calculating the quark propagator on such configurations. Doing so, we hope to understand the role of instantons in the quark propagator.

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