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**Toward a mininum criteria of multi dimensional instanton formation for condensed matter systems?** ANDREW BECKWITH, APS/ Contractor, FNAL — We present near the end of this document a promising research direction as to how to generalize a technique initially applied to density wave current calculations to questions of instanton formation in multi dimensional condensed matter systems. Initially we review prior calculations done through a numerical simulation that the massive Schwinger model used to formulate solutions to CDW transport in itself is insufficient for transport of soliton-antisoliton (S-S') pairs through a pinning gap model of CDW transport. Using the Peierls condensation energy permits formation of CDW S-S' pairs in wave functionals. This leads us to conclude that if there is a small spacing between soliton-antisoliton (S-S') charge centers, and an approximate fit between a tilted washboard potential and the system we are modeling, that instantons are pertinent to current/transport problems. This requires a very large 'self energy' final value of interaction energy as calculated between positive and negative charged components of soliton-antisoliton (S-S') pairs with Gaussian wave functionals as modeled for multi dimensional systems along the lines of Lu's generalization given below. The links to a saddle point treatment of this instanton formation are make explicit by a comment as to a cosmology variant of instanton formation in multi dimensions we think is, with slight modifications appropriate for condensed matter systems.

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