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Applicability of Parallel Computing to Partial Wave Analysis[1]
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— Bound states of Quantum Chromodynamics (QCD) give insights into the nature of confinement, a key element of the strong interaction. States may be identified from weak signals extracted from the analysis of high statistics data from reactions with many final state particles. One of the best tools for the analysis of these reactions is Partial Wave Analysis (PWA). PWA transforms an ensemble of experimental data from a large acceptance detector from free particle eigenstates to angular momentum eigenstates. The PWA program must be fast enough to deal with the large amounts of data available currently, as processing time scales with the number of events. The scope of this research is to study the applicability and scalability of Intel's Xeon Phi using the Many Integrated Core (MIC) architecture when applied to the existing PWA code at Jefferson Laboratory. An algorithm was developed for the Xeon Phi and scaled across 240 available threads, giving parallel functionality to the PWA which was originally written serially. This scaling can make the fitting process fifteen times faster.

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