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Research Area: Computational Sciences and Engineering

With today's supercomputers we have the possibility of perform calculations that a few years ago were impossible to live to see the result. We now can consider the inter-atomic forces as important variables in our calculations. The use of rapidly convergent algorithms to obtain the eigenvalues and correspondent eigenvectors of large sparse matrices is only an example of what can be done. This computational power can be used to the study of new technology, for example in the development of new semiconductors. New architectures and programming structures had to be developed. Parallel programming in multiple cores processors is this new way to perform millions of calculations in seconds. I will be working in the area of many-body physics of strongly correlated electronic systems, with applicability to condensed matter theory. The Density Matrix Renormalization Group DMRG is a numerical method used to describe quantum many-body physics. The DMRG++ is C++ implementation of the DMRG. This research project will work improving the program input file. This file is in text format and is difficult to address any errors. Our mission is to convert it to a more readable format using JSON.

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