

Project Title:

Pair density wave states in strongly correlated 2D systems

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1. Background and purpose of the project, relationship of the project with other projects

High temperature superconductors such as cuprates have been investigated for decades. But a clear understanding of such systems is still lacking. One mystery is related to the microscopic mechanism of the pseudogap phase which shows signature of formation of Cooper pairs but does not reach superconducting state. Understanding this problem is key to approaching superconductors with higher temperature, which are desired for various applications in order to reduce electric power consumption. Recently, it has been proposed that the pseudo gap phase is closely related to pair density waves. In this project, we attack this problem by numerical studying the properties of the pair density states with various 2D models for cuprates.

2. Specific usage status of the system and calculation method

Calculation method: numerical integral and optimization using Matlab.

Status: Only few jobs were executed before I turned to another cluster in my own laboratory.

3. Result

None.

4. Conclusion

None.

5. Schedule and prospect for the future

More jobs may be executed on this supercomputer in the future solving stable solutions of the pair density wave states and calculating the physical quantities to understand high temperature superconductors.

6. If no job was executed, specify the reason.

Only a few jobs were executed and then I turned to another cluster in my own laboratory