

Theoretical and Computational Study of Functionalities of Solids



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Status	Associate Professor
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Affiliations	The Physical Society of Japan
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Keywords	Photo-induced phenomena, transition metal oxides, quantum many-body theory
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Technical Support Skills	<ul style="list-style-type: none"> • Solid state physics • Open MP/MPI parallel computing • First principles electronic structure calculation
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Research Contents

We are theoretically studying condensed matter physics, focusing on the multi-stability of materials, which are closely related to functionality of materials such as conductive, magnetic and dielectric properties. Especially, we are interested in the following topics:

- (1) Photo-induced phase transition
 - Elucidation of structural change induced by photo-excitation
 - Study of dynamical properties of photo-excited electrons and phonons

- (2) First-principles electronic structure calculation of transition metal oxides (thin films)
 - Simulation of environment dependent electronic structure with competition of charge, spin, and orbital orders
 - Simulation of thin-film with explicit consideration of surfaces and substrates

- (3) Quantum many-body theory for electron correlations with multi orders
 - Development of Resonating Hartree-Fock-Bogoliubov theory

Available Facilities and Equipment
