



60th RAP Seminar

The 60th Seminar on RIKEN Center for Advanced Photonics

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Date: **January 18(Fri) 16:00 - 17:00, 2019**

Location: **W319, 3F, Cooperation Center, Wako Campus, RIKEN**

(理研 和光キャンパス 研究交流棟 3階会議室 W319)

Title: **Development of Materials Integration System for Performance Prediction**

マテリアルズインテグレーションによる構造材料の性能予測

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Many studies have been investigated to predict properties of materials using numerical calculation. Excellent results have been demonstrated when atomic structures directly contribute to the physical properties of materials. However, it is generally very difficult to predict the performances of materials which are necessary for structural materials because these macroscopic performances are induced by the complex relationship among many phenomena in different scales. In our recent projects the development of performance prediction system for welded structures was planned to contribute the research and development of materials, where forward calculation modules for prediction of macroscopic performances such as fatigue strength, creep strength, hydrogen embrittlement, brittle fracture and so on have been developed using theoretical considerations and empirical rules. Results in prediction of fatigue behavior will be presented. On the other hand, in machine learning, it was found that accurate prediction can be made by selecting the data set appropriately. It was also found that the accuracy could be improved by determining the structure of neural network taking material knowledge into consideration. These approaches are expected to be useful tools for future material development.