## 博士論文公聴会の公示(物理学専攻)

学位申請者:西田 充宏

 論文題目: Aspects of the gauge/gravity correspondence: holographic superconductor and geodesic Witten diagram (ゲージ/重力対応の諸相: ホログラフィック超伝導体と測地ウィッテン図)
日時:2017年 2月 8日 (水) 10:30-12:00
場所:理学研究科H棟7階7階セミナー室(H701号室)

主查 : 大野木 哲也

副查 :橋本幸士、黒木和彦、山口哲、飯塚則裕

論文要旨: The gauge/gravity correspondence is a conjecture of the duality between field theory and gravity theory. One approach of the study about the gauge/gravity correspondence is calculation based on assumption of the correspondence. By using a dual description method, we can obtain a new physical perspective. Another approach is to compare corresponding objects in the two theories which are dual to each other. Such a test is important for confirming and extending the application range of the gauge/gravity correspondence. In part 1, we study a three-scalar holographic superconductor model which can describe frustration. We analyze solutions of this model and compute the free energy of the solutions. We find that there are chiral ground states in this model. This holographic model will be useful for study of multicomponent superconductivity in strongly correlated systems from the viewpoint of the gauge/gravity correspondence. In part 2, we study the correspondence between geodesic Witten diagrams and conformal partial waves with an external symmetric traceless tensor field. We construct an amplitude of the geodesic Witten diagrams and show that it is consistent with the properties and the formulas of the conformal partial waves. Construction of the geodesic Witten diagrams gives us a novel expression of the conformal partial waves. We construct and analyze the holographic model by the bottom-up process in part 1 and we verify the correspondence between the objects in conformal field theory and AdS spacetime in part 2. These results lead to understand the holographic description of various objects.