

Title: Functoriality Principle and the Spectral Theory of Automorphic Functions

Abstract: In these two lectures we start by explaining a number of problems in arithmetic and spectral theory of automorphic functions both on the Poincare and Siegel half spaces and their generalizations. We then show how they can be resolved by appealing to certain cases of Langlands functoriality conjecture which allows these functions to be transferred to functions on spaces of higher dimension in a canonical way. These transfers are now established by the speaker and his collaborator in a number of cases. Our discussion will include the recent developments on the conjectures of Ramanujan and Selberg for Maass forms, as well as their generalizations to more general groups. We will also explain how these results lead to new cases of Artin conjecture as well as to the existence of Siegel modular forms of weight 3 and other arithmetic and spectral results. We conclude these lectures by sketching in a simple language how these transfers are established.