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Hecke algebras for  $p$ -adic groups, the explicit Local Langlands Correspondence and stability

Abstract : I will talk about my joint work with Aubert where we prove the Local Langlands Conjecture for  $G_2$  (explicitly). This uses our earlier results on Hecke algebras attached to Bernstein components of (arbitrary) reductive  $p$ -adic groups, as well as an expected property on cuspidal support, along with a list of characterizing properties (including stability). In particular, we obtain "mixed" L-packets containing F-singular supercuspidals and non-supercuspidals. Our methods are inspired by the Langlands-Shahidi method, Deligne-Lusztig and Lusztig theories etc. If time permits, I will explain how to characterize our correspondence using stability of L-packets, by computing character formulae in terms of (generalized) Green functions; one key input is a homogeneity result due to Waldspurger and DeBacker. Moreover, I will mention how to adapt our general strategy to construct LLC for other reductive groups, such as  $GSp(4)$ ,  $Sp(4)$ , etc. The latter parts are based on recent joint work with Suzuki.