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*On the Multiplicities in the Restriction of a Supercuspidal Representation*  

The representation theory of reductive groups over $p$-adic fields can be split into two areas, namely the study of parabolically induced representations and the study of supercuspidal representations. Given a reductive group $G$ defined over a $p$-adic field $F$, one can construct supercuspidal representations of any positive depth via the Adler-Yu construction. This construction uses what Yu called a $G$-datum. It was later proved by Kim-Fintzen that these constructions exhaust all positive depth supercuspidal representations for large enough $p$.

In this talk, we will be interested in the restriction of a positive depth supercuspidal of $G(F)$ to the subgroup $G_{der}(F)$, where $G_{der}$ denotes the derived subgroup of $G$. The goal is to further explore a conjecture regarding multiplicity one established by Adler and Prasad. To understand such a restriction, we first define how to restrict a $G$-datum to $G_{der}$-data. We can then study how the supercuspidals arising from the various $G_{der}$-data produced appear in the restriction to $G_{der}(F)$ of the supercuspidal arising from the initial $G$-datum. The question of multiplicity one in this restriction then reduces to the study of certain depth zero supercuspidal representations.