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The Mackey Dichotomy in Classification Problems.

George Mackey will probably be best remembered for his program for constructing and classifying the unitary representations of locally compact groups. This required novel analytic techniques to supplement the classical algebraic methods. In particular, he used the Murray-von Neumann algebraic continuous dimensions to replace the usual integer valued dimensions of linear algebra. In his investigations he discovered a completely new phenomenon in mathematics. He showed that there was a profound descriptive set-theoretic obstruction to the unitary classification of representations of "non-smooth" groups. He went on to conjecture that a group is smooth if and only if continuous dimensions do not occur in the description of the centrally trivial representations. This was subsequently proved by James Glimm (Annals of Math. 1961). It was only natural to conjecture that similar classification dichomotomies exist in other areas of mathematics. This is indeed the case. I will briefly describe some of the remarkable results of Kechris, Hjorth and others, and I will also propose some dichotomies that have yet to be discovered. (Received August 28, 2006)