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***Topological centres for group algebras, actions, and quantum groups.***

ABSTRACT. The study of topological centres has been a very active field in Banach algebra theory and abstract harmonic analysis for many years. I shall report on recent progress concerning the solution of various topological centre problems, on the one hand, and the use of such results as a tool, on the other hand. Particular emphasis will be placed on the following:

- the positive solution, for a large class of compact non-metrizable groups, of the Cecchini–Zappa conjecture [1981] on the centre of the bidual of the Fourier algebra  $A(G)$  (joint work with M. Filali and M. Sangani Monfared) – note that, as shown by V. Losert, the conjecture fails for the compact metrizable group  $SU(3)$ ;
- the positive solution, for all locally compact, second countable groups  $G$ , of the Ghahramani–Lau conjecture [1994] on the topological centres of the bidual of the measure algebra  $M(G)$  (joint work with J. Pachl and J. Steprans);
- the negative solution of a question raised by Lau–Ülger [1996] on the structure of certain multipliers on von Neumann algebras (joint work with Z. Hu and Z.-J. Ruan);
- my negative solution of Farhadi–Ghahramani’s multiplier problem [2007] regarding the bidual of  $L_\infty(G)$ ;
- topological centres for group actions and their relation to the number of invariant means for the action (joint work with J. Pachl and J. Steprans);
- topological centres and invariant means for algebras over locally compact quantum groups (joint work with Z. Hu and Z.-J. Ruan).