Extremally disconnected topological groups

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In this talk we present our partial results on the well-know problem of Arhangel'skii on the existence in ZFC of a non-discrete Hausdorff extremally disconnected (or ED for short) topological group; it was posed in 1967 and has been extensively studied since then. The problem is still open even for separable (eq., countable) groups, although several consistent examples have been constructed.

We have two lines of research:

1. (with M. Hrušák) The connection between the existence of a separable non-discrete Hausdorff ED topological group and the existence of a nowhere dense ultrafilter on ω.

2. We introduce the notion of algebraic free sequence on topological group and we show that if an ED Boolean topological group admits a countable nontrivial algebraic free sequence, then there is a rapid ultrafilter on ω.

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