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Do syndetic sets contain arbitrarily long geometric progressions?(joint with Andreas Koutsogiannis and Florian Richter)

It is an early result of Erdős that any set of positive integers of positive lower asymptotic density contains a subset of the form $\{m, mn\}$. Twelve years ago, Beiglböck, Bergelson, Hindman, and Strauss considered the problem of finding geometric progressions $\{m, mn, mn^2, ..., mn^k\}$ in syndetic subsets (those with bounded gaps), but to this day we do not know if such sets contain even $\{m, mn^2\}$. Narrowing the class of syndetic sets, we can consider return times of points to open sets in minimal topological dynamical systems. In this talk, we will show that point returns in totally minimal distal systems contain arbitrarily long geometric progressions.