$\aleph_1$-free abelian non-Archimedean Polish groups

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An uncountable $\aleph_1$-free group can not admit a Polish group topology but an uncountable $\aleph_1$-free abelian group can, as witnessed e.g. by the Baer-Specker group $\mathbb{Z}^\omega$, in fact, more strongly, $\mathbb{Z}^\omega$ is separable. In this talk we will investigate $\aleph_1$-free abelian non-Archimedean Polish groups. We will talk about two main results. The first is that there are continuum many separable (and so torsionless, and so $\aleph_1$-free) abelian non-Archimedean Polish groups which are not topologically isomorphic to product groups and are pairwise not continuous homomorphic images of each other. The second is that the following four properties are complete co-analytic subsets of the space of closed abelian subgroups of S_∞: separability, torsionlessness, $\aleph_1$-freeness and $\mathbb{Z}$-homogeneity.