Ayhan Gunaydin

Small subgroups of the circle group.

There is a well-behaving class of dense ordered abelian groups called "regularly dense ordered abelian groups". This property is introduced by Robinson and Zakon as the first order counterpart of being an archimedean ordered group. Every dense subgroup of the additive group of reals is regularly dense. In this talk we consider subgroups of the multiplicative group, S, of all complex numbers of modulus 1. Such groups are not ordered, however they have an "orientation" on them: this is a certain ternary relation on them that is invariant under multiplication. We have a natural correspondence between oriented abelian groups, on one side, and ordered abelian groups satisfying a cofinality condition with respect to a distinguished positive element 1, on the other side. This correspondence preserves model-theoretic relations like elementary equivalence. Then we shall introduce a first-order notion of "regularly dense" oriented abelian group; all infinite subgroups of S are regularly dense in their induced orientation. Finally we shall consider the model theoretic structure (R, Γ), where R is the field of real numbers, and Γ is dense subgroup of S satisfying the Mann property, interpreted as a subset of R^2. We shall determine the elementary theory of this structure