962-22-928 **W. W. Comfort*** (`wcomfort@wesleyan.edu`), Wesleyan University, Middletown, CT 06459 USA, and **Jorge Galindo** (`jgalindo@mat.uji.es`), Universitat Jaume I, 12071 Castellon, Spain.

Extremal Phenomena in Pseudocompact Topological Groups.

It is unknown whether every pseudocompact topological group G with uncountable weight α admits (A) a proper pseudocompact topological group refinement; (B) a proper dense pseudocompact subgroup. Positive results are known in many cases, for example: For (A), for Abelian G which (1) are compact or (2) have a clopen basis; for (B), for Abelian G with (1) or (2) or with $|G| > \mathfrak{c}$ or $\alpha \leq \mathfrak{c}$.

We show that (A) holds, indeed with a refinement of maximal weight $2^{|G|}$, for Abelian G which are (i) compact or (ii) torsion-free with $\alpha \leq |G| = |G|^\omega$ or (iii) [GCH] torsion-free. [Remark: Assertion (A)(i) answers a question of Comfort and Remus, Math. Zeit. 215 (1994), 337-346.] This Lemma is useful:

Lemma. Let Abelian G be pseudocompact in the topology $\mathcal{T}_A$ induced by a subgroup A of $H := Hom(G, \mathbb{T})$. Then for $f \in H$ with $A \cap \langle f \rangle = \{0\}$, the group $(G, \mathcal{T}_{\langle A \cup \{f\} \rangle})$ is pseudocompact iff $f[G]$ is compact and $ker(f)$ is G_δ-dense in $(G, \mathcal{T}_A)$.

With additional argument, that Lemma yields this Theorem:

Theorem. Let G be Abelian and pseudocompact. If G is torsion-free then G has (A) or (B); if $\alpha \leq \mathfrak{c}$ or $r_0(G) > \mathfrak{c}$ then G has (A) and (B). (Received September 29, 2000)