Expansion of valued fields by multiplicative subgroup

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Let K be a field and G be a multiplicative subgroup of K. Can we describe $Th(K,G)$? In [1], L. van den Dries and A. Günaydin consider this problem when K is the field of real or complex numbers and when G has Mann property. It is a natural question to ask if such results can also be achieved for valued fields. In this talk, I will present special cases of this problem. First, for $K = \mathbb{Q}_p$ and $G = n^{\mathbb{Z}}$ where $n \in \mathbb{N}$. Then, for $K = \mathbb{C}_p$ and G is the kernel of the Iwasawa logarithm. In both cases, G has the Mann property. I will give an axiomatisation of the theories and describe their definable sets.

References

[1] A. Günaydin et L. van den Dries,The fields of real and complex numbers with a small multiplicative group, Proceedings of London Mathematical Society 93, 43-81 (2006)

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