1111-20-552 **Alfred Geroldinger*** (alfred.geroldinger@uni-graz.at), University of Graz, Institute for Mathematics and Scientific Comp, Heinrichstrasse 36, 8010 Graz, Austria. *Sets of lengths in Krull monoids.*

Let H be a Krull monoid with finite class group G and suppose that each class contains a prime divisor (rings of integers in algebraic number fields share this property). For each element $a \in H$, its set of lengths $\mathsf{L}(a)$ consists of all $k \in \mathbb{N}_0$ such that a can be written as a product of irreducible elements. Sets of lengths of H are finite nonempty, and they depend just on the class group G. We consider the system $\mathcal{L}(G) = \{\mathsf{L}(a) \mid a \in H\}$ of all sets of lengths. It is classical that H is factorial if and only if $|G| = 1$, and that $|G| \le 2$ if and only if $|L| = 1$ for each $L \in \mathcal{L}(G)$.

The present talk is devoted to the inverse problem whether or not the class group G is determined by the system of sets of lengths. Thus, let G' be a finite abelian group with $|G'| \ge 4$ and $\mathcal{L}(G) = \mathcal{L}(G')$. Does it follow that G and G' are isomorphic ? This question has been answered in the affirmative for cyclic groups, elementary 2-groups, and others. In the present talk we present the result that the answer to the above problem is positive for groups G having rank at most two. The proof is based on methods from Additive Combinatorics. This is joint work with Wolfgang A. Schmid. (Received February 09, 2015)