

## Mathematical Colloquia

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**Monday, 30 May 2022**

17:15 h, lecture room B6 (ExWi)

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# Quasi-homomorphisms from the integers into Hamming metrics

**Abstract:** A function  $f: \mathbb{Z} \rightarrow \mathbb{Q}^n$  is a  $c$ -quasihomomorphism if for all  $x, y$  in  $\mathbb{Z}$  the Hamming distance between  $f(x+y)$  and  $f(x) + f(y)$ , i.e. the number of entries  $i$  in  $\{1, 2, \dots, n\}$  for which the  $i$ -th entry of  $f(x+y)$  does not equal the  $i$ -th entry of  $f(x) + f(y)$ , is at most  $c$ .

A 0-quasihomomorphism is simply a (group) homomorphism from  $\mathbb{Z}$  to  $\mathbb{Q}^n$ . We are interested to see whether, when given a  $c$ -quasihomomorphism  $f$ , there is a homomorphism  $g$  such that for all  $x$  in  $\mathbb{Z}$  the Hamming distance between  $f(x)$  and  $g(x)$  is bounded by some function  $C(c)$  independent of  $n$  and our choice of  $f$ . We will use combinatorial methods to answer this question, which will prove a special case of a question posed by Kazhdan and Ziegler.