

*The Mini-course on*

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## **Introduction to Coarse Geometry and $C^*$ -algebras**

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We introduce the notion of asymptotic dimension for metric spaces and discuss some of its basic properties. We discuss the uniform Roe algebra  $Cu^*(X)$  of a metric space  $(X,d)$  and explain how the coarse geometric properties of a metric space are reflected in the  $C^*$ -algebraic properties of its uniform Roe algebra.

We discuss in details the relation between property (A) of  $X$  and nuclearity of  $Cu^*(X)$ . We also explain how the asymptotic dimension of  $X$  is related to the nuclear dimension of  $Cu^*(X)$ .

### **References**

G. Bell, A. Dranishnikov, *Asymptotic dimension*, Topology and its Applications **155** (2008) 1265-1296.

N.P. Brown, and N. Ozawa,  *$C^*$ -algebras and finite-dimensional approximations*, Graduate Studies in Mathematics **88**, American Mathematical Society, Providence, RI, 2008.

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