

# Cu-nuclearity and applications

Cristian Ivanescu

MacEwan University

August, 2021

- K-amenable groups (J. Cuntz 1983)

- K-amenable groups (J. Cuntz 1983)
- KK-amenable algebras (G. Skandalis 1988)

- K-amenable groups (J. Cuntz 1983)
- KK-amenable algebras (G. Skandalis 1988)
- K-amenable or KK-amenable does **NOT** imply nuclearity of the algebra

# Definition

## Definition

$A$  is **Cu-nuclear** if the canonical quotient map

$$\pi : A \otimes_{\max} B \rightarrow A \otimes_{\min} B$$

induces an isomorphism

$$Cu(A \otimes_{\max} B) \cong Cu(A \otimes_{\min} B)$$

for all  $C^*$ -alg  $B$ .

# Definition

## Definition

$A$  is **Cu-nuclear** if the canonical quotient map

$$\pi : A \otimes_{\max} B \rightarrow A \otimes_{\min} B$$

induces an isomorphism

$$Cu(A \otimes_{\max} B) \cong Cu(A \otimes_{\min} B)$$

for all  $C^*$ -alg  $B$ .

**Theorem**, with Kucerovsky

$A$  is Cu-nuclear implies  $A$  is nuclear

# Definition

## Definition

$A$  is **weak Cu-nuclear** if there is an isomorphism

$$Cu(A \otimes_{max} B) \cong Cu(A \otimes_{min} B)$$

for all  $C^*$ -alg  $B$ .

# Definition

## Definition

$A$  is **weak Cu-nuclear** if there is an isomorphism

$$Cu(A \otimes_{max} B) \cong Cu(A \otimes_{min} B)$$

for all  $C^*$ -alg  $B$ .

**Theorem**, with Kucerovsky



# Definition

## Definition

$A$  is **weak Cu-nuclear** if there is an isomorphism

$$Cu(A \otimes_{max} B) \cong Cu(A \otimes_{min} B)$$

for all  $C^*$ -alg  $B$ .

## **Theorem**, with Kucerovsky

For a  $C^*$ -algebra with finitely many ideals, weak Cu-nuclear implies nuclearity

## Applications

- Investigate further the relation between weak Cu-nuclear and Cu-nuclear

## Applications

- Investigate further the relation between weak Cu-nuclear and Cu-nuclear
- Check if the Cuntz semigroup is Cu-nuclear to deduce amenability of  $C^*$ -algebra

## Applications

- Investigate further the relation between weak Cu-nuclear and Cu-nuclear
- Check if the Cuntz semigroup is Cu-nuclear to deduce amenability of  $C^*$ -algebra
- Thank you