STRUCTURES
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UNIVERSITÄT
HEIDELBERG
ZUKUNFT
SEIT 1386

STRUCTURES JOUR FIXE
- ONLINE SPECIAL -

1.30 PM TOBI HAAS
QuIC, Université Libre de Bruxelles

14.15 PM JAMES FARRE
Mathematisches Institut, Uni Heidelberg

14.30 PM AUGUSTIN MORENO
Mathematisches Institut, Uni Heidelberg

July 8, 2022 1:30 PM

ONLINE ONLY: Zoom Meeting ID: 935 6549 3662,
Code: 928036
Contact: office@structures.uni-heidelberg.de

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ABSTRACT

Tobi Haas
When quantum fields experience spacetime curvature, many fascinating phenomena arise. This includes cosmological particle production, which occurs when the spacetime metric is explicitly time-dependent. However, detecting this phenomenon in the night sky remains an open challenge. Following recent theoretical and experimental developments in Heidelberg, we report on a novel quantum field simulator to engineer a quantum field experiencing an expanding universe of positive as well as negative spatial curvature in a 2+1 dimensional Bose-Einstein condensate with adjustable trapping potential and interaction strength. We demonstrate the successful implementation by comparing novel analytical results to the propagation of acoustic excitations and, for the first time, observe cosmological particle production in the lab, in agreement with cosmological predictions.

James Farre
Introduction to his work and group at Mathematisches Institut, Uni Heidelberg.

Augustin Moreno
Introduction to his work and group at Mathematisches Institut, Uni Heidelberg.

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