



12th International Conference
on New Frontiers in Physics

10-23 July 2023

Kolymbari, Crete, Greece

The Origin of $1/f$ fluctuations in Music and Physics

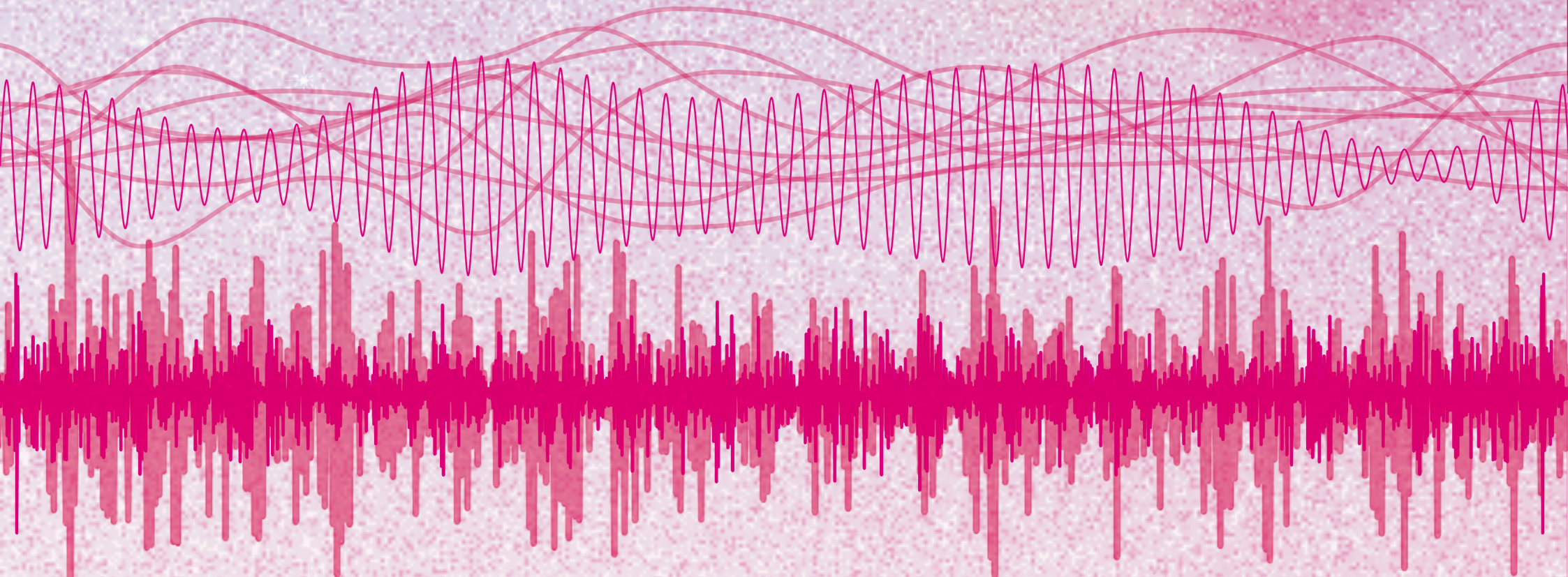
20.07.2023

19:00 – 20:00

OAC Amphitheatre

Masahiro Morikawa

Professor of Ochanomizu University, Japan, is an Astrophysicist. He is particularly interested in the basic mechanisms that show up on multiple scales.



People often mention that classical music exhibits $1/f$ fluctuations. Let's check it. The sound signal itself does not show a $1/f$ spectrum. However, curiously, the square of the signal clearly shows $1/f$ fluctuations, the rectified signal as well.

These $1/f$ fluctuations are encoded as amplitude modulation (AM) in the music sound waves, and squaring the signal demodulates it (DM). Beyond music, this AM/DM mechanism appears everywhere, yielding $1/f$ fluctuations: from microscopic electric devices to astrophysical objects. We explore this fluctuation physics.