

PHYSICS COLLOQUIUM

Speaker: **Prof. Krzysztof Sacha**
Institute of Physics,
Jagiellonian University in Krakow



Topic: **Time Crystals**

Time and Tuesday, May 5, 2026, **2:50 pm** – hybrid event

place: **The colloquium will be held in REC/C213.**

Online participation possible:

Zoom-Meeting: Meeting-ID: 674 4304 6840 / passcode: PC-SoSe26

<https://tu-dresden.zoom-x.de/j/67443046840?pwd=QAEHLWawl2P3iDmQToOSHhNYgu3Fzz.1>

Host: Prof. Frank Großmann

Abstract: Ordinary spatial crystals have been studied for centuries, and their properties are now widely applied in many areas of physics and technology. More recently, it has been realized that crystalline structures can also emerge in time. Research in this direction has been developing steadily for over a decade. In this talk, I will discuss spontaneous formation of time crystals in interacting many-body systems and how condensed matter physics can be explored in the time domain using periodically driven systems. I will also describe how these ideas may be used to develop time-tronics, in which time-crystalline structures play a role analogous to that of printed circuit boards, enabling the design of versatile quantum systems. This framework allows for the realization of structures of higher than three dimensions, with flexible connectivity and reconfiguration, and may offer new ways to implement quantum gate operations. Overall, the study of crystalline order in time provides new possibilities for organizing and controlling complex quantum systems beyond the constraints of conventional spatial crystals.

Bio: Krzysztof Sacha earned his PhD in 1998 from the Jagiellonian University in Kraków. He has held fellowships from the Alexander von Humboldt Foundation in Marburg and the Fulbright Program at Los Alamos National Laboratory. Currently, he serves as a professor at the Jagiellonian University. His research spans quantum chaos, atom-laser interactions, and ultracold atomic gases, with a primary focus on time crystals over the last decade. For his pioneering works on time crystals, he was honored with the Foundation for Polish Science Prize, the most prestigious and distinguished scientific award in Poland.

