

**Plenary Talk**

PV V Wed 9:00 Paulussaal

**Is physics timeless ?** — ●JAN MICHAEL ROST — Max Planck Institute for the Physics of Complex Systems, Dresden, Germany

Time has always fascinated and puzzled humanity and plays a role in very different contexts, from society, to individual living beings, to fundamental laws of nature. In quantum mechanics, time has the peculiar property that it is a parameter and not an operator. In this talk we will try to understand time and this quantum property by arguing

that time is not fundamental but emerges upon separation of systems. More specifically, we will derive from the heavily entangled eigenstate of a global Hamiltonian comprising the system and its environment the time-dependent Schroedinger equation for the system under interaction of system and environment. Tanking this relational time approach one step further, thermodynamics for the system can also be derived with complex relational time as emergent from a structureless, global energy eigenstate.