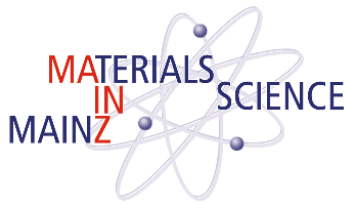




PRISMA+



Physics Colloquium Mainz

Tuesday, 22nd October 2019

Institute for Nuclear Physics

Lecture Hall

Johann-J.-Becher-Weg 45

4.15pm Tea from 3.45pm

Professor Andreas Burkert
Faculty of Physics
LMU Munich



Disk Galaxies: Our Fascinating Cosmic Habitats

Galaxies are the fundamental building blocks of the Universe. Gas-rich spiral disk galaxies are the cosmic islands where stars and planets form and where the chemical building blocks of life are generated. However, despite their importance, we are still far from a detailed understanding of their structure and the processes that drive their evolution. I will discuss some of the puzzles of disk galaxies that are currently a major focus of astrophysical research and will focus especially on recent observations of young galaxies in the early Universe, 3 Gyrs after the Big Bang. This was the era with the peak of the cosmic star formation rate. It was the time of rapid galaxy assembly and the epoch where galaxy morphology were established. The observations show a diversity of galactic systems with physical properties that are unparalleled in the present Universe. Very gas-rich, extended, fast rotating and highly turbulent galactic disks have been found, dominated by gigantic star-forming gas clumps. Very surprisingly, no signature of dark matter is found in these galaxies, despite the fact that we believe no galaxy to be able to form without dark matter. These observations open a fascinating window into galaxy evolution. They reveal a rich variety of dynamical processes that at the moment are far from being understood.