



## KONWERSATORIUM INSTYTUTU FIZYKI UMCS

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### **Magnetic Reconnection in Astrophysics**

Magnetic reconnection is a fundamental process in astrophysical plasmas, responsible for the rapid conversion of magnetic energy into heat, plasma motion, and non-thermal particle acceleration. This presentation explores the challenges of understanding reconnection in complex astrophysical environments, emphasizing its multiscale nature, the coupling of large-scale MHD dynamics with kinetic dissipation processes, and the unique features of 3D reconnection. The role of turbulence, both as a driver and a product of reconnection, is discussed, highlighting how it accelerates the reconnection rate and impacts energy distribution. Investigations of instability-driven turbulence, including tearing mode and Kelvin-Helmholtz instability, offer insights into the mechanisms that sustain turbulent energy cascades. The implications of fast reconnection for particle acceleration in relativistic magnetized jets are also examined, showcasing its significance in high-energy astrophysical phenomena such as cosmic ray production. These findings underscore the importance of reconnection in the broader context of astrophysical plasma dynamics and energy release mechanisms

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Uprzejmie zapraszam wszystkich pracowników, doktorantów i studentów Instytutu Fizyki.

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