

Großes Physikalisches Kolloquium an der Universität zu Köln

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Physics of viruses

Physical law imposes important constraints for virus structure, replication and spread. Here we discuss how it can help to better understand the different stages of the viral life cycle. Most viruses use a spherical protein shell to protect their genome; its assembly has to avoid kinetic trapping and malformed structures, a process that can be analyzed with statistical models for self-assembly. Many viruses, including SARS-CoV-2, influenza A and Ebola, are in addition wrapped by a membrane which anchors the glycoproteins attaching them to the host cells. Continuum models can be used to identify the physical limits of the entry process, including the minimal size and typical time required for entry. For enveloped viruses, the most critical step in the life cycle is the opening of a fusion pore, to release the genome into the host cell. Continuum models can be used to calculate the corresponding free energy landscape and to identify strategies to prevent this last step of the infection.

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16³⁰ Uhr
HS III

