

PHYSIKALISCHES KOLLOQUIUM

AM 16. DEZEMBER 2019 UM 17 UHR C.T.

IM GROßEN HÖRSAAL

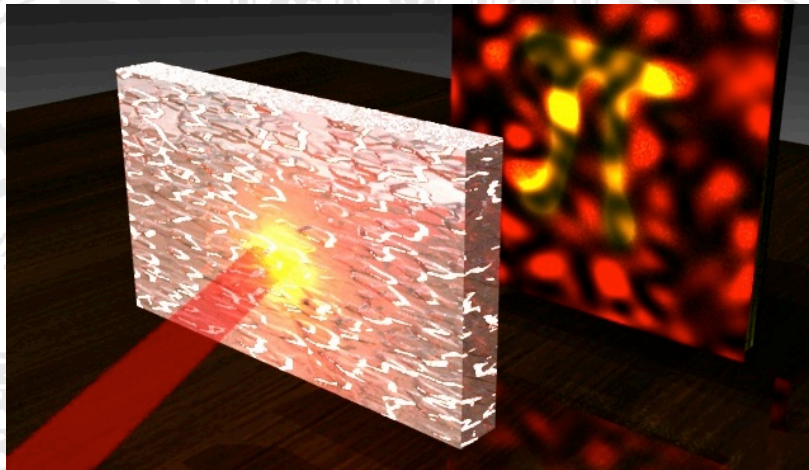


Fig.: impression of speckle interacting with a fluorescent object [1,4].

OPEN TRANSMISSION CHANNELS: A WINDOW FOR IMAGING IN SCATTERING MEDIA

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Random scattering of light, which takes place in paper, paint and biological tissue is an obstacle to imaging and focusing of light and thus hampers many applications. At the same time scattering is a phenomenon of basic physical interest as it allows the study of fascinating interference effects such as open transport channels [1,2], which enable lossless transport of waves through strongly scattering materials. These speckle correlation effects are associated with a relatively broad bandwidth [3], raising the question whether they are associated with light that has undergone a less-than average number of scattering events. A thorough understanding of these open channels and the correlations between scattered and ballistic waves may help high-resolution [4] and prior-information-based [5] imaging methods to be generalized to volume scattering media. Ultimately, such methods are envisioned to extend the operational depth of tissue optics methods such as multiphoton imaging or OCT.

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