

Coherence in x-ray physics

B. Lengeler
Aachen University

The concept of coherence is used in quantum mechanics, optics, x-ray and neutron scattering, mesoscopic electron transport. It will first be discussed what interferes in a physical event and what destroys interference. Then we treat chaotic light sources and one-mode lasers and the description of that light in terms of coherence functions of first and second order. The influence of the sample on coherence will be treated in a third part. The uncertainty in the momentum transfer defines a generalized coherence volume. When its size is larger than the illuminated volume speckle can be observed. Differences in x-ray, neutron and electron transport will be addressed. A few examples will illustrate the concepts.