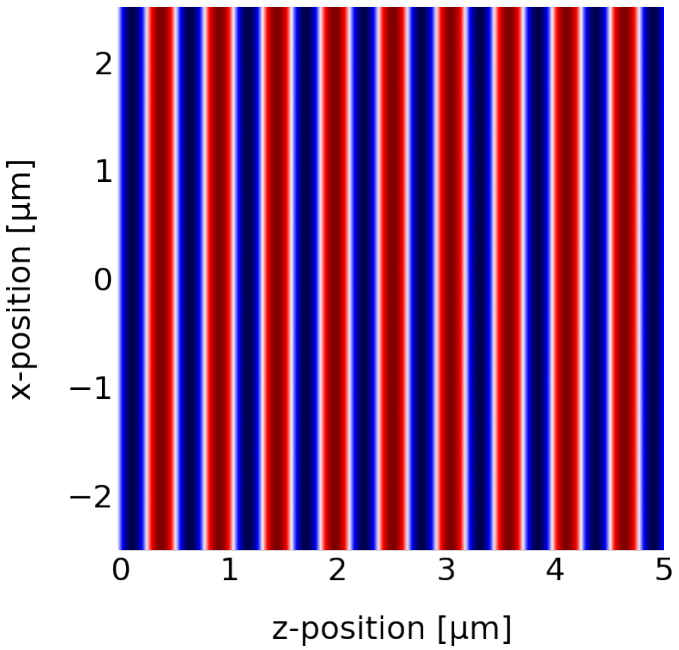
Experimental Physics 3 - Em-Waves,Optics, Quantum mechanics

Lecture 7

Prof. Dr. Frank Cichos
WS 2022/23

2. Wave Optics

Plane waves



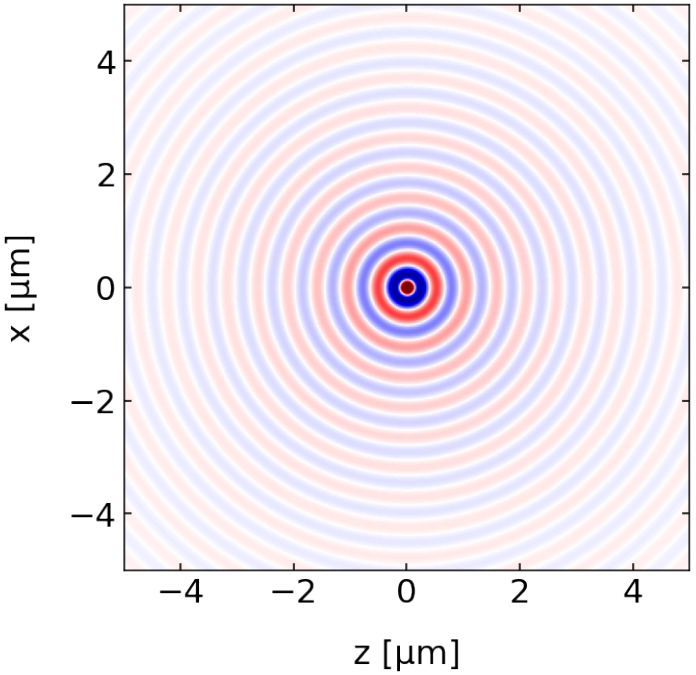
wave amplitude $U(\vec{r}) = Ae^{-i\vec{k}\cdot\vec{r}}$

intensity $I(\vec{r}) = |A|^2$

wavevector $\vec{k} = \{k_x, k_y, k_z\}$

wavenumber $k = |\vec{k}|$

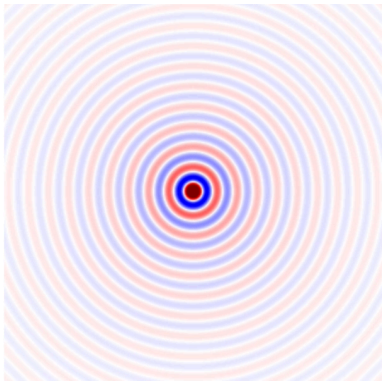
Spherical waves



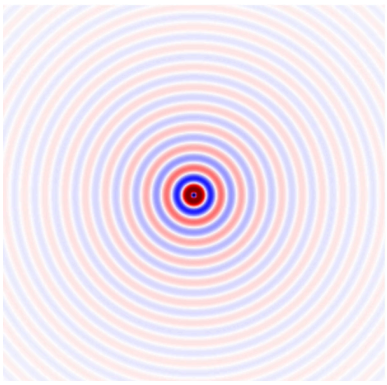
$$U(\vec{r}) = \frac{A}{r} e^{-ikr}$$

$$I(\vec{r}) = \frac{|A|^2}{r^2}$$

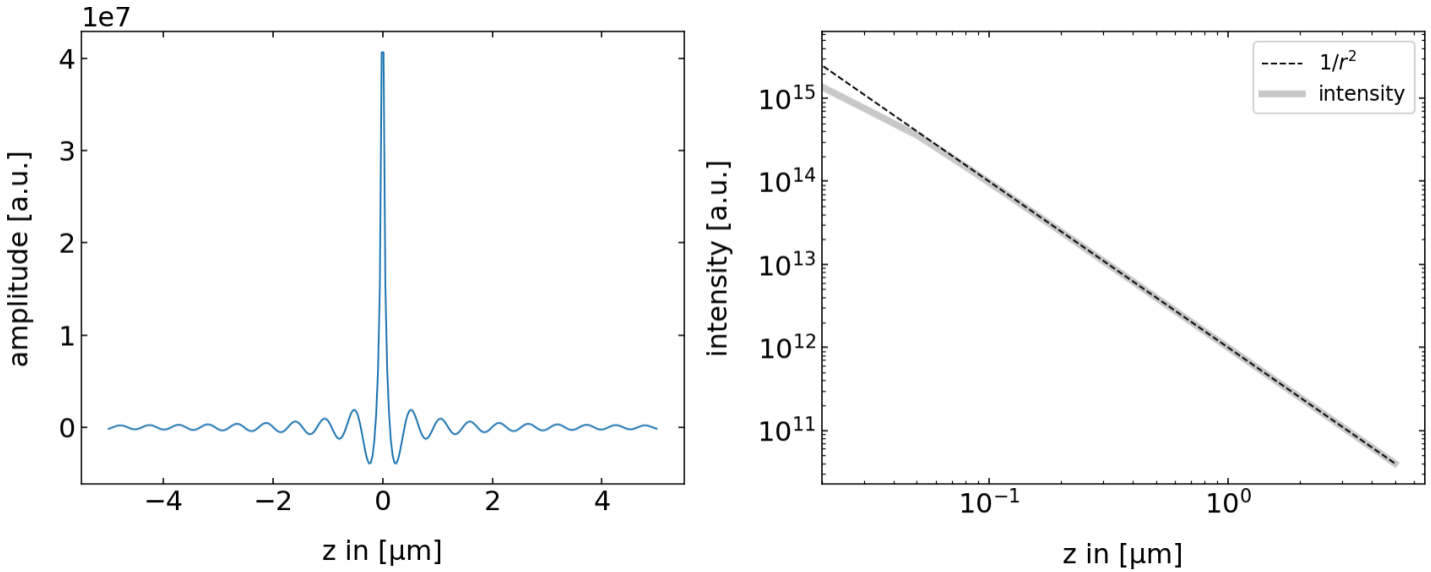
e^{-ikr}



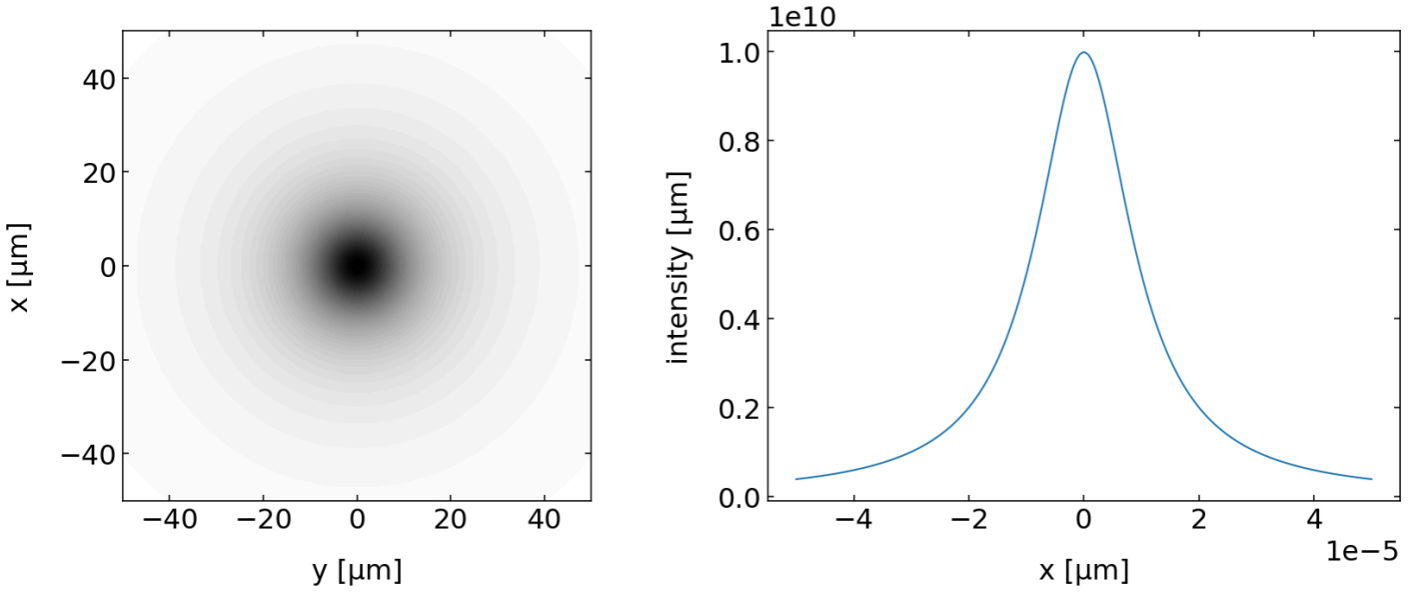
e^{ikr}



Intensity Spherical Wave



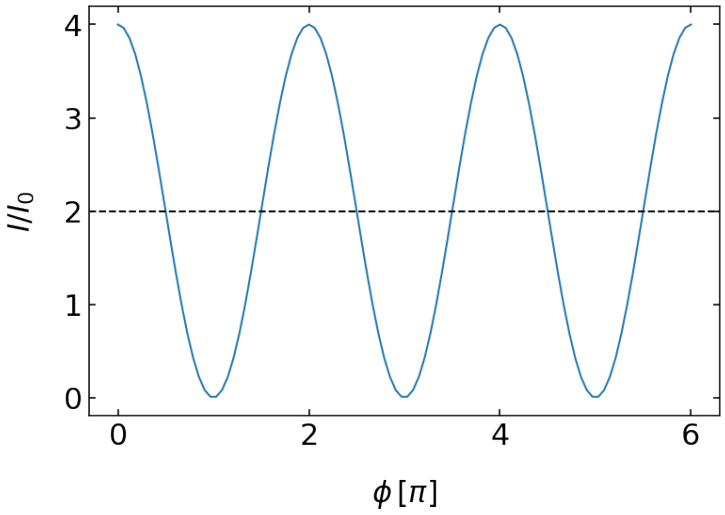
Intensity Spherical Wave

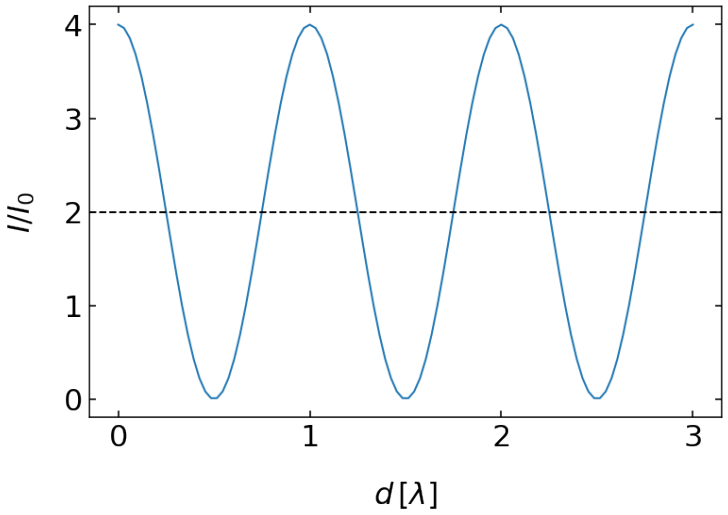


in a plane at a distance

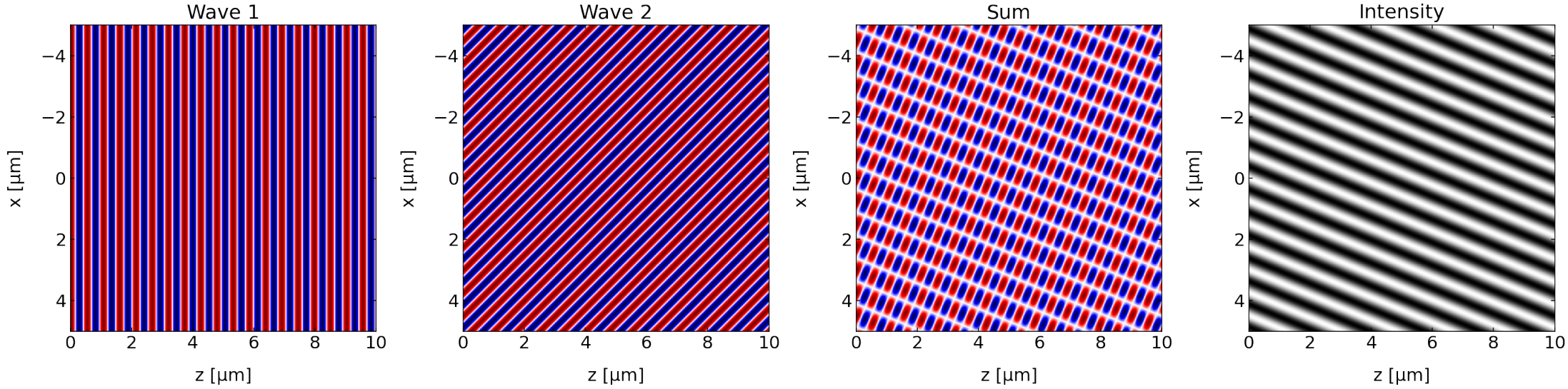
Interference

Interference

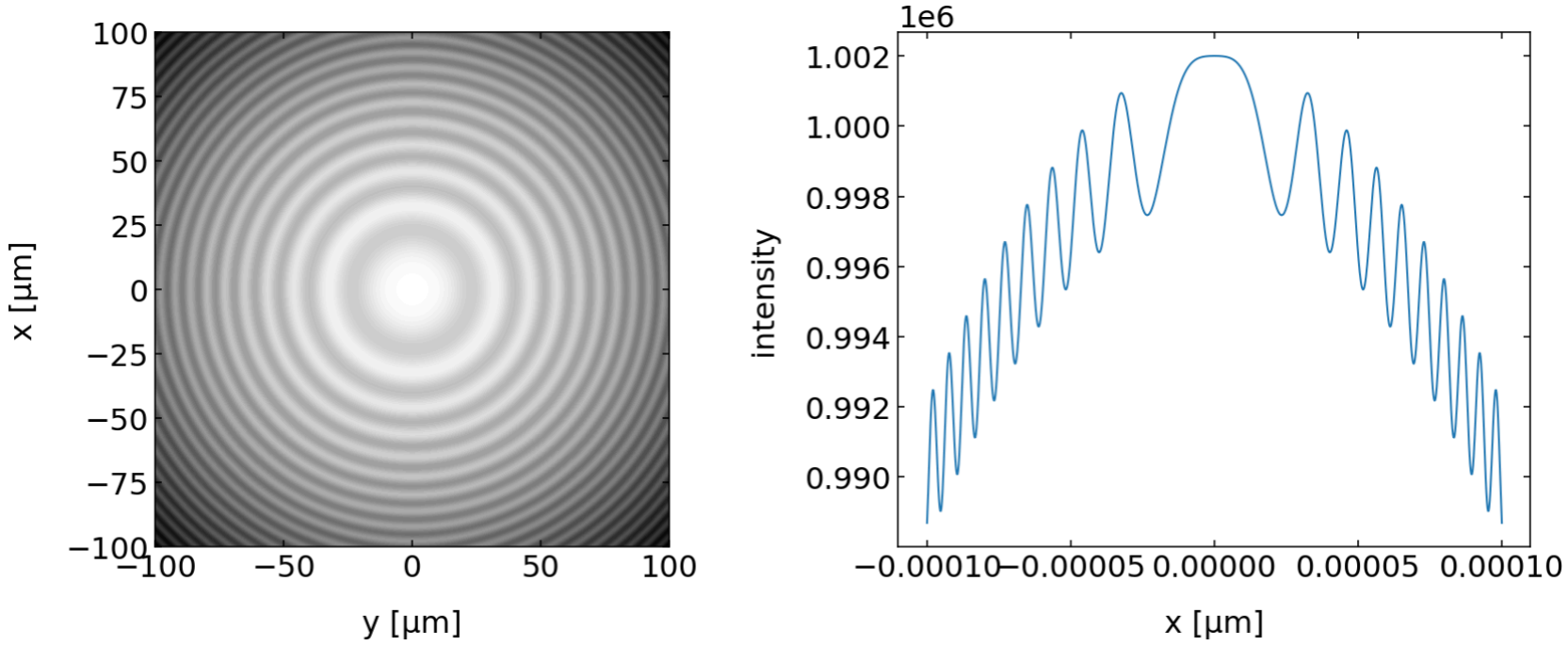




Interference in Space



Interference Between Spherical and Plane Wave



Interferometers