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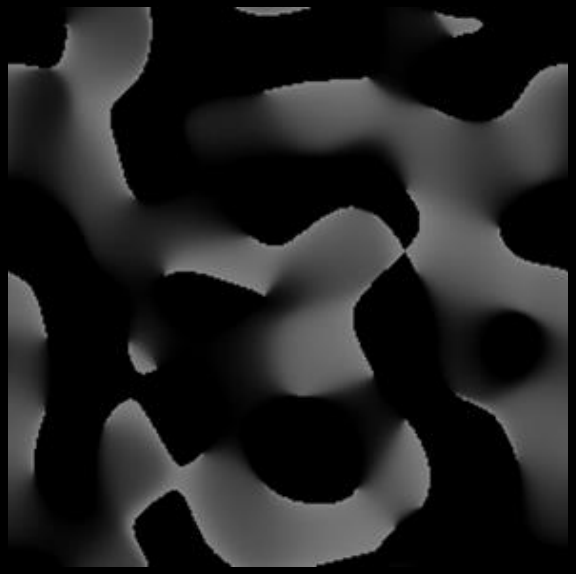
# LASER BEAM GENERATION

# Flat top beams



Spectral degree of coherence of the source

$$\mu^{(0)}(\rho_2 - \rho_1; \omega) = \frac{1}{C_0} \sum_{m=1}^{M} \binom{M}{m} \frac{(-1)^{m-1}}{m} e^{-\frac{|\rho_2 - \rho_1|^2}{2m\delta(\omega)^2}}$$

Screen

Where $\rho_1$ and $\rho_2$ are two dimensional position vectors, ω is the angular frequency, $C_0$ is the normalization factor used for obtaining the same maximum intensity level for any number of terms M in summation, $C_0 = \sum_{m=1}^{M} \binom{M}{m} \frac{(-1)^{m-1}}{m}$ and $\binom{M}{m}$ is the binomial coefficient. $\delta(\omega)$ is the r.m.s. correlation width.

# Ring beams

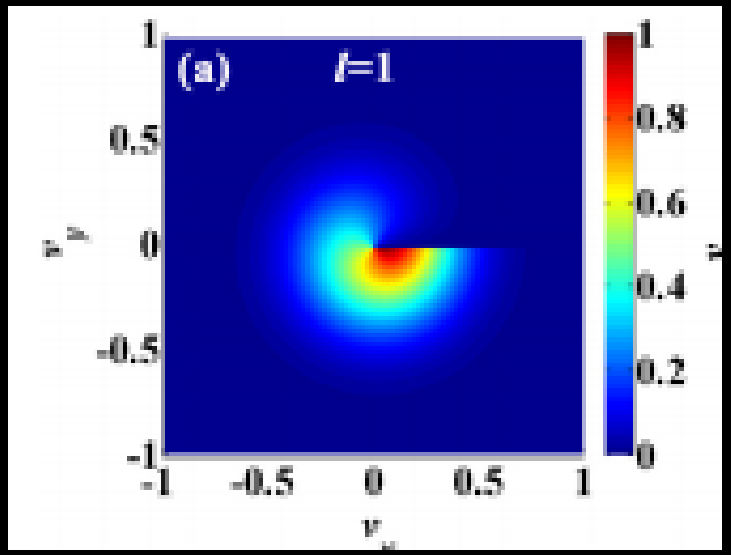
Spectral degree of coherence of the source

$$\eta^{(0)}(\rho_1 - \rho_2) = J_0\left(\beta \frac{|\rho_1 - \rho_2|}{\alpha}\right) e^{\left(\frac{|\rho_1 - \rho_2|^2}{2\alpha^2}\right)}$$

Where J_o (x) is the Bessel function of the first kind and zero order, and , ρ=|ρ_1-ρ_2 | are position distances and superscript (o) refers to the source plane. β and α are real numbers that control the radius and the thickness of the ring.

Screen

# Radial intensity beams

Spectral degree of coherence of the source

$$\mu^{(0)}(\mathbf{r}_1,\mathbf{r}_2) = \exp\left(-\frac{r_d^2}{2\delta_0^2}\right) - \sqrt{\frac{1}{2\pi}}\frac{r_d}{\delta_0}\exp\left(\frac{-r_d^2}{4\delta_0^2}\right)\sum_{m=1}^{\infty}\frac{1}{m}(-i)^{ml}\sin(ml\varphi_d) \times\left[I_{(ml-1)/2}\left(\frac{r_d^2}{4\delta_0^2}\right) - I_{(ml+1)/2}\left(\frac{r_d^2}{4\delta_0^2}\right)\right].$$