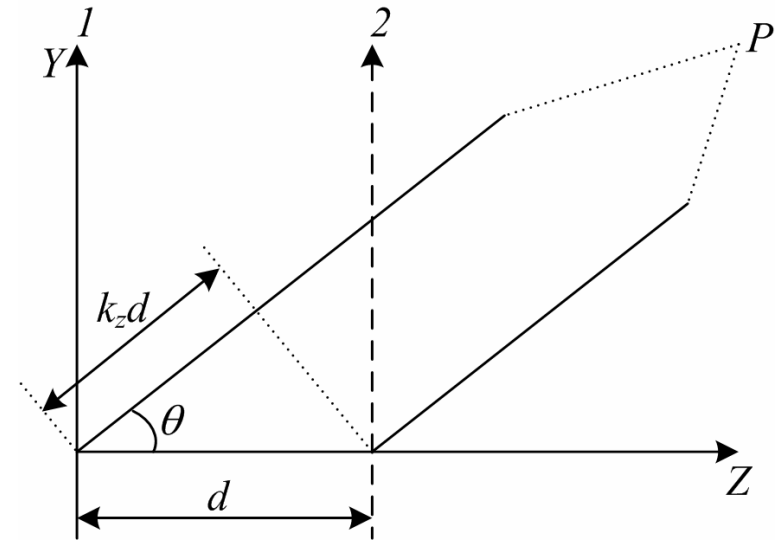
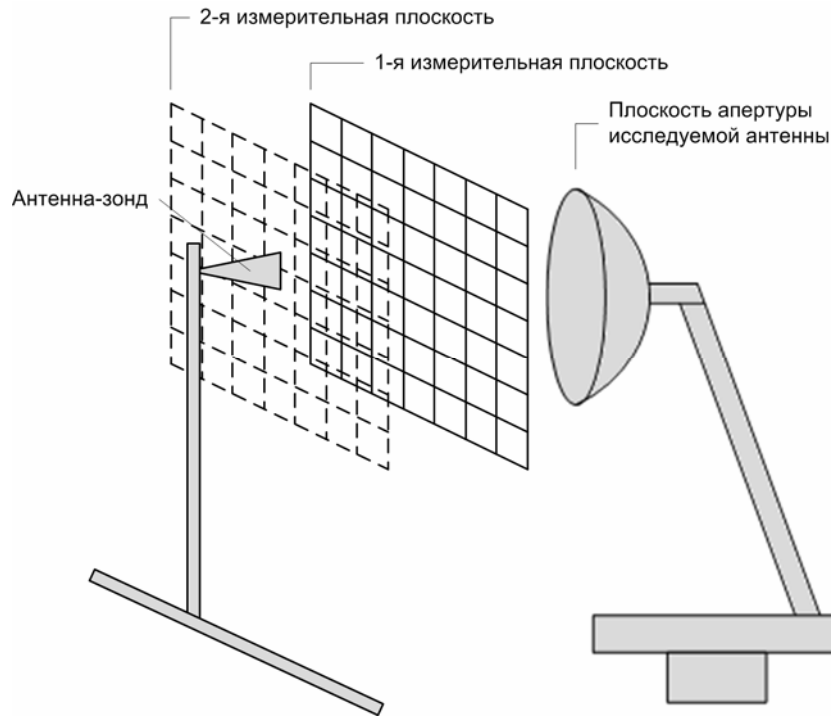


Измерение диаграмм направленности в плоском сканере без измерения фазы



$$A_{x,y}(k_x, k_y) = \mathfrak{T}\{E_{x,y}(x, y, z=0)\} = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} E_{x,y}(x, y, z=0) e^{j(k_x x + k_y y)} dx dy,$$

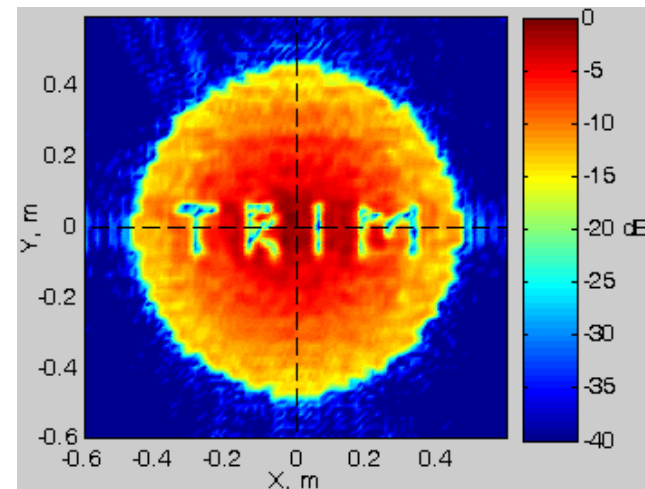
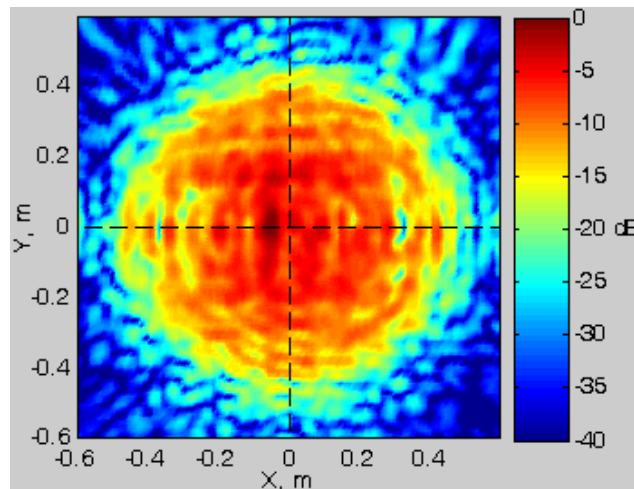
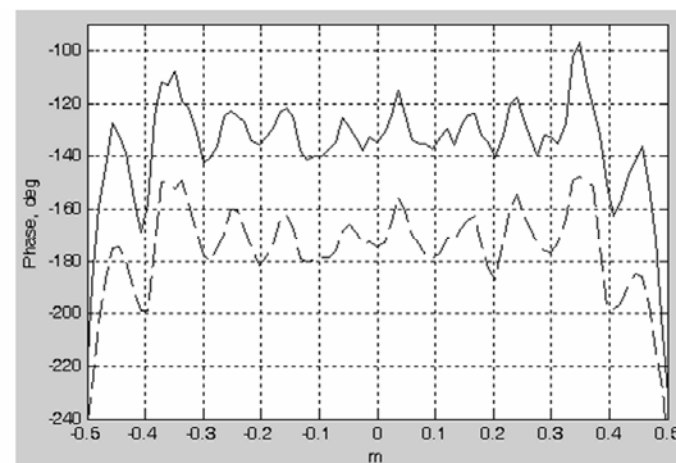
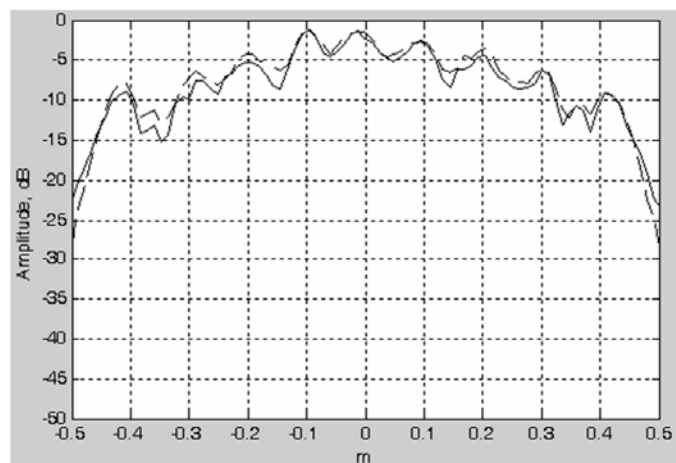
$$E_{x,y}(x, y, z=0) = \mathfrak{T}^{-1}\{A_{x,y}(k_x, k_y)\} = \frac{1}{2\pi} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} A_{x,y}(k_x, k_y) e^{-j(k_x x + k_y y)} dk_x dk_y$$

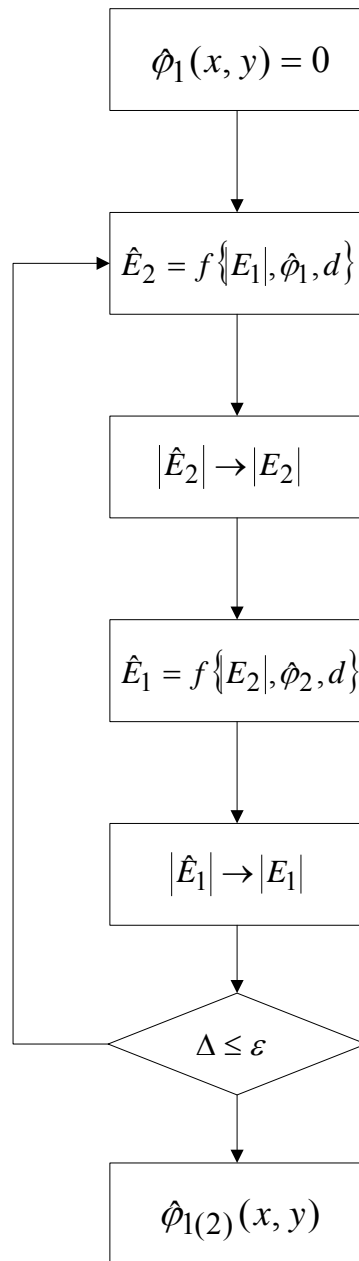
$$k_x = k_0 \sin \theta \cos \phi, \quad k_y = k_0 \sin \theta \sin \phi$$

$$k_0 = \frac{2\pi}{\lambda},$$

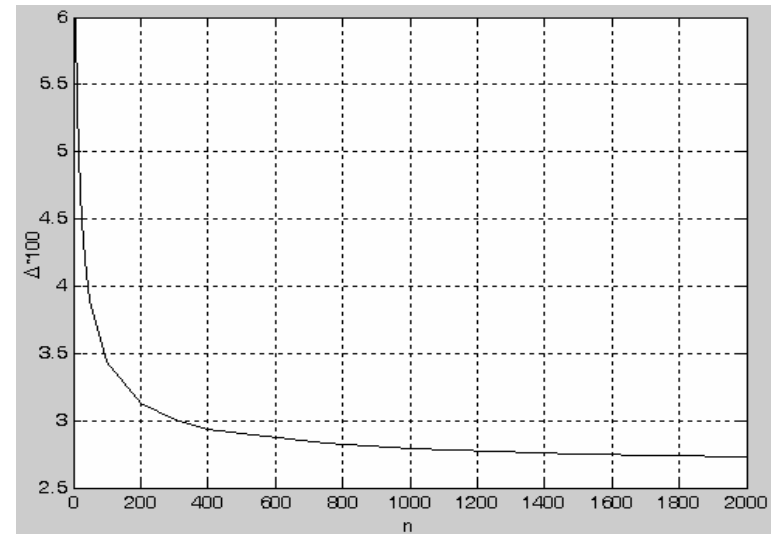
$$\varphi_d = \frac{2\pi}{\lambda} d \cos \theta = k_z d.$$

$$E_{x,y}(x, y, z=d) = \mathfrak{T}^{-1}\left\{\mathfrak{T}\{E_{x,y}(x, y, z=0)\} e^{-jk_z d}\right\}$$



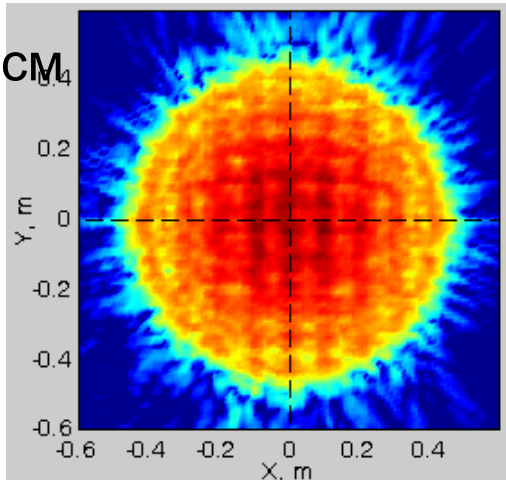


$$\Delta = \sqrt{\frac{\sum_x \sum_y [|E_1(x, y)| - |\hat{E}_1(x, y)|]^2}{\sum_x \sum_y |E_1(x, y)|^2}}$$



Восстановление фазы

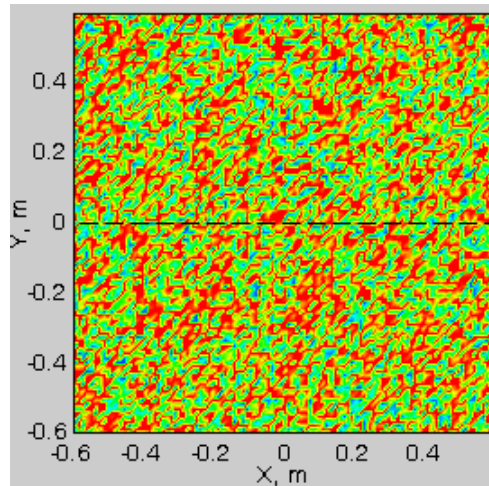
$d=10\text{ cm}$



+

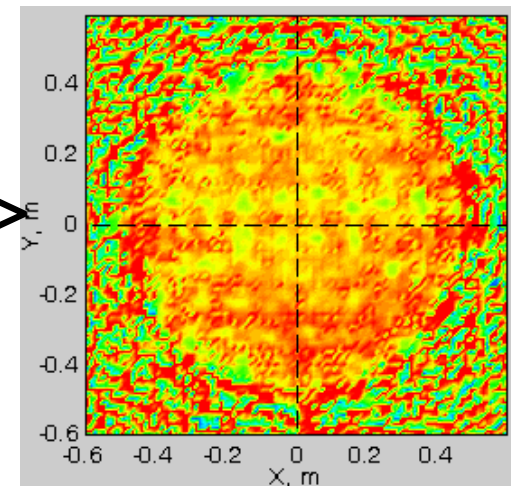
=

Meas.

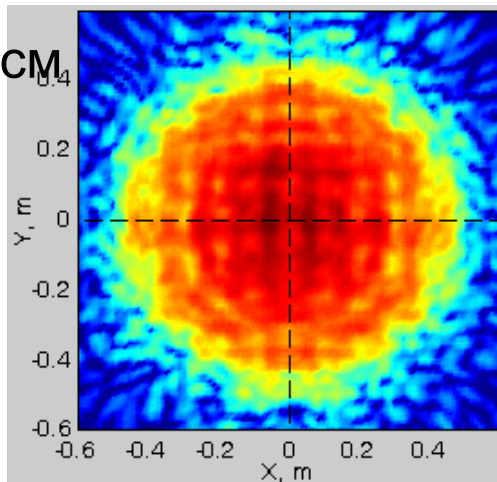


-

Calc.

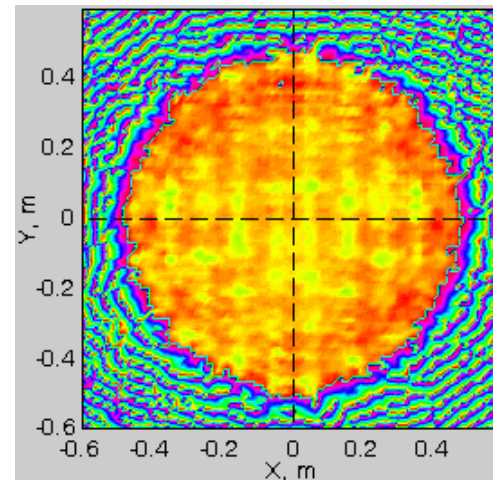


$d=40\text{ cm}$



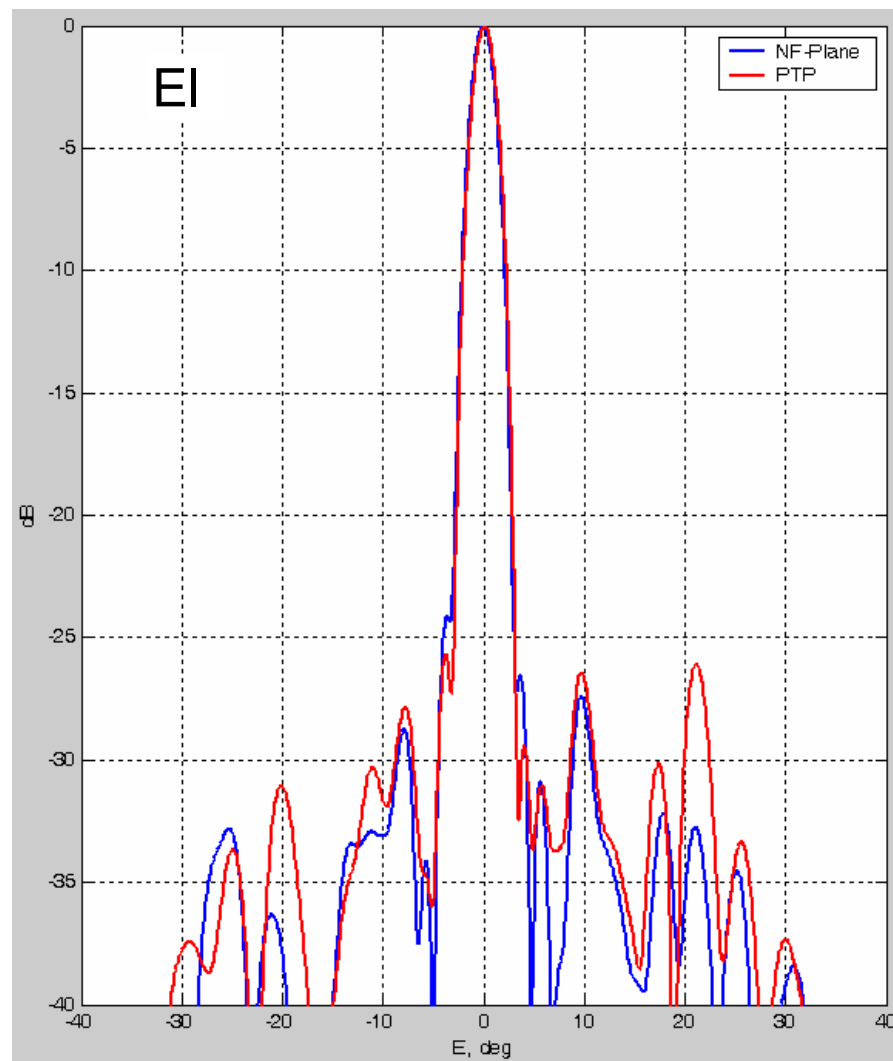
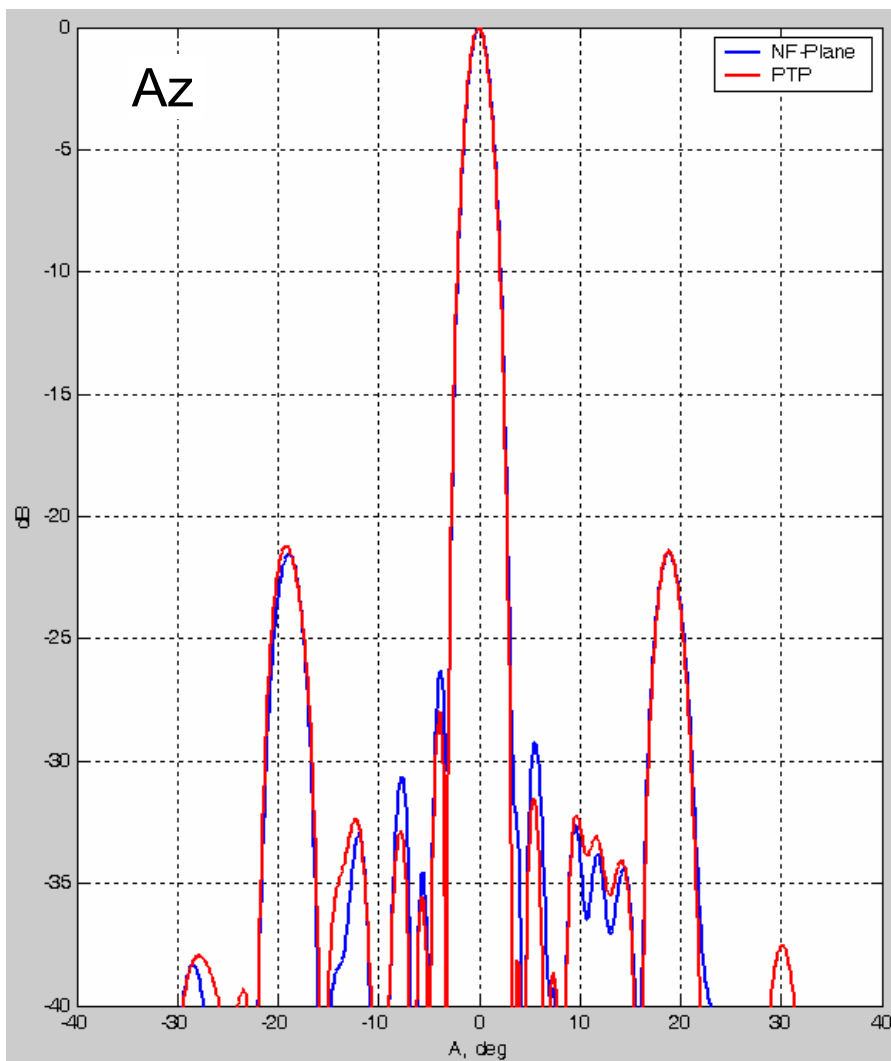
Meas. ($d=10\text{ cm}$)

(



)

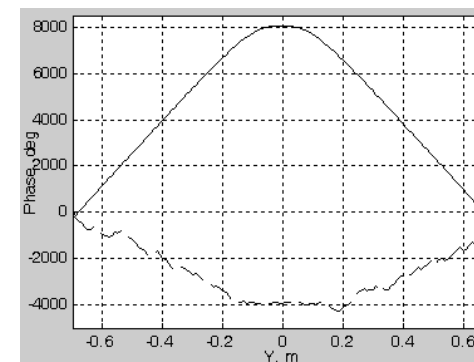
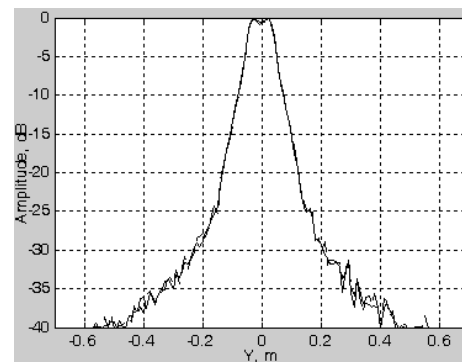
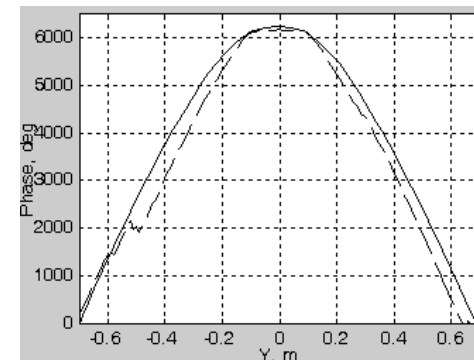
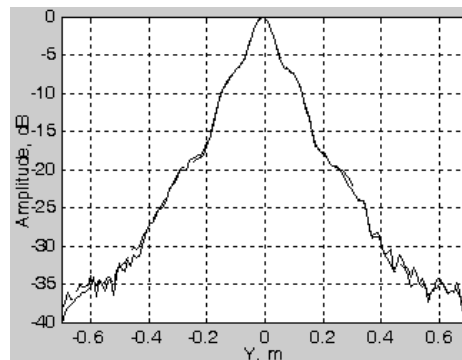
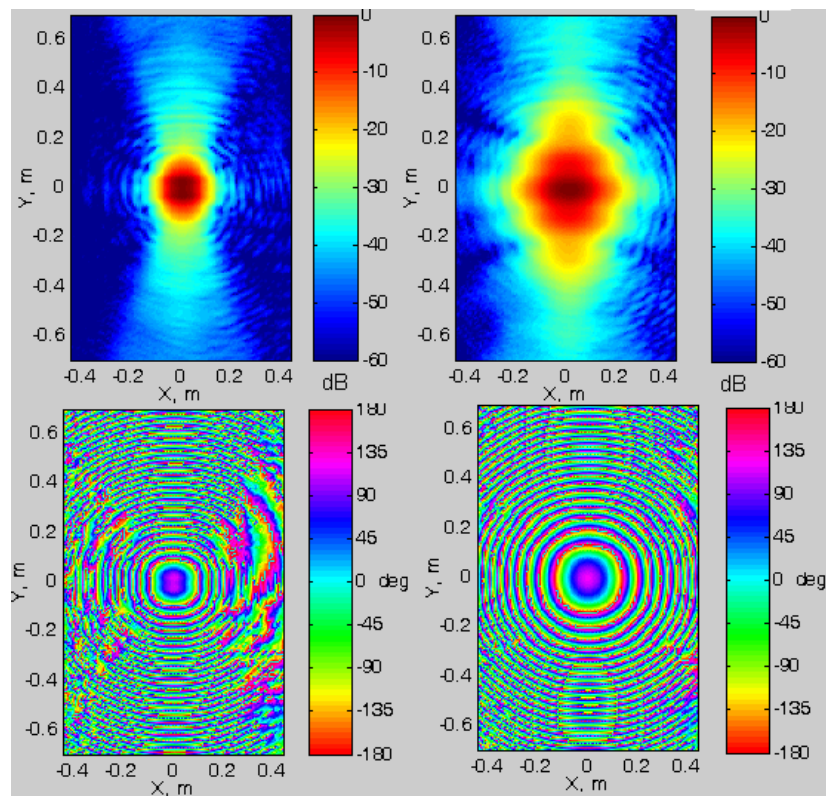
Восстановление фазы



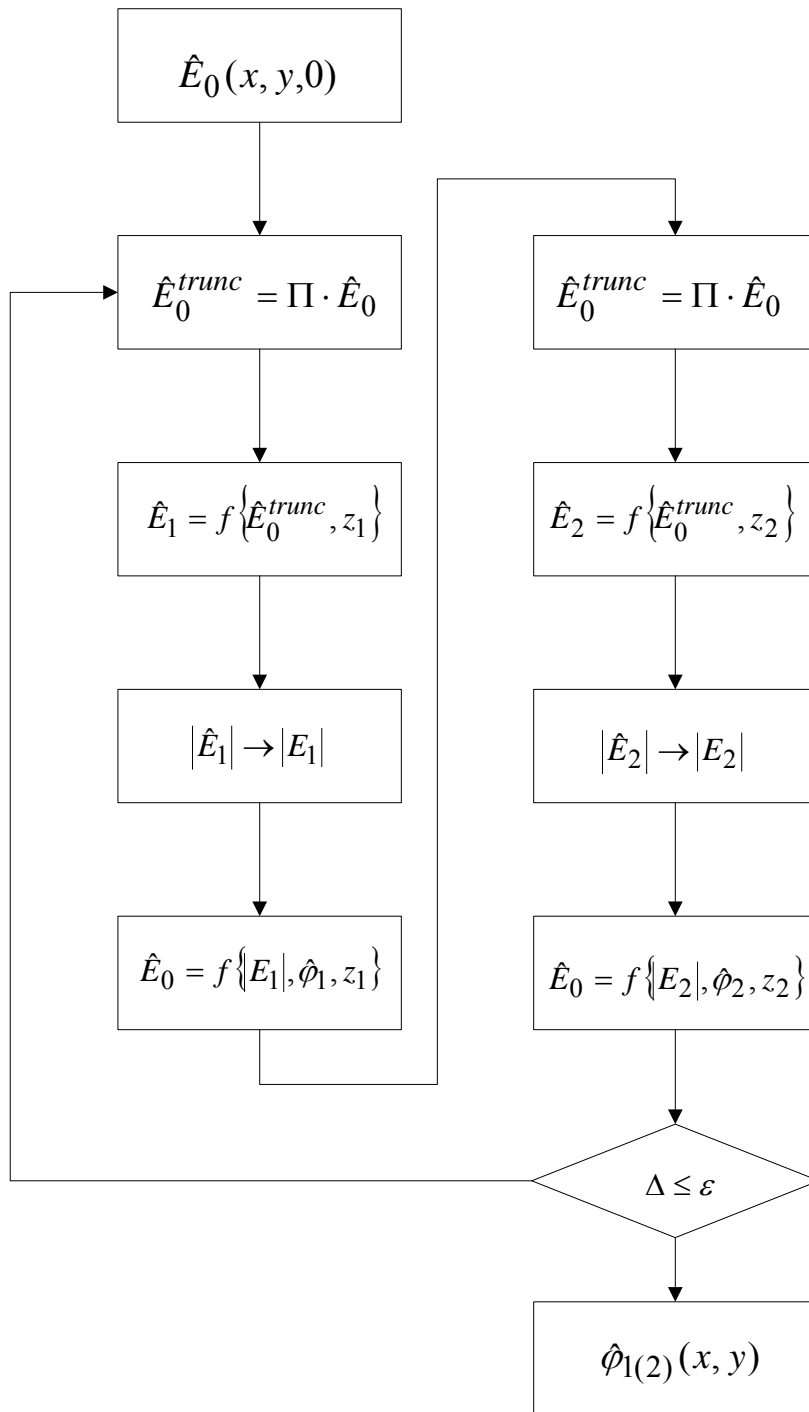
$$f=12 \text{ ГГц}$$

$$z_1=0.9 \text{ м}$$

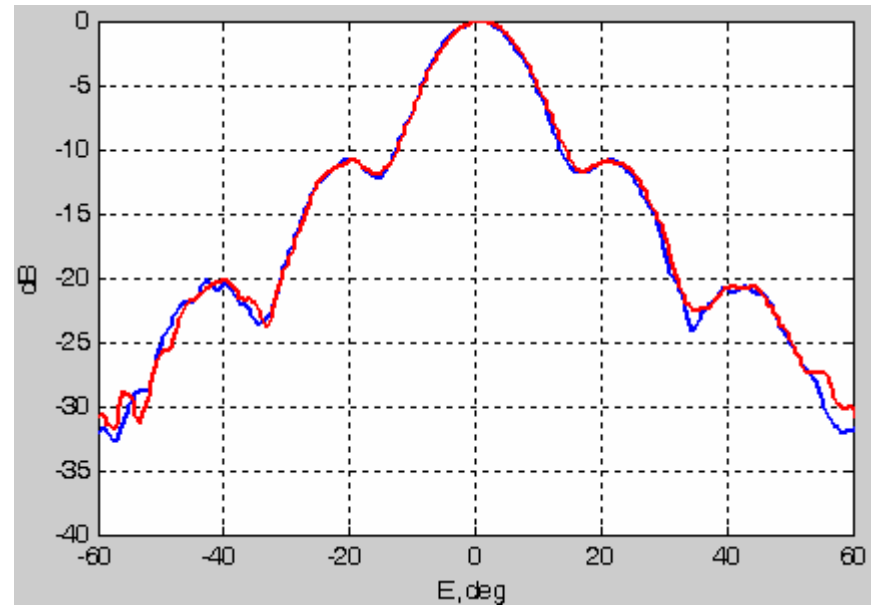
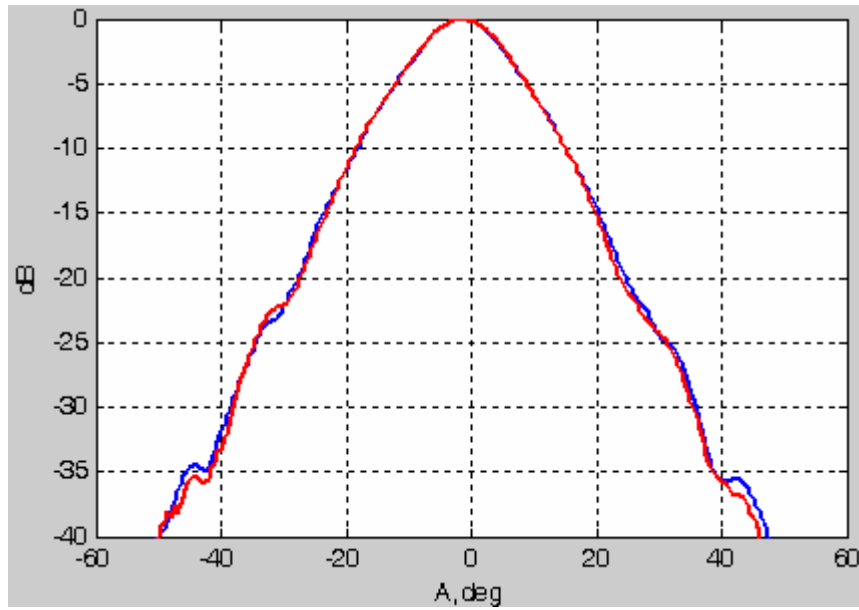
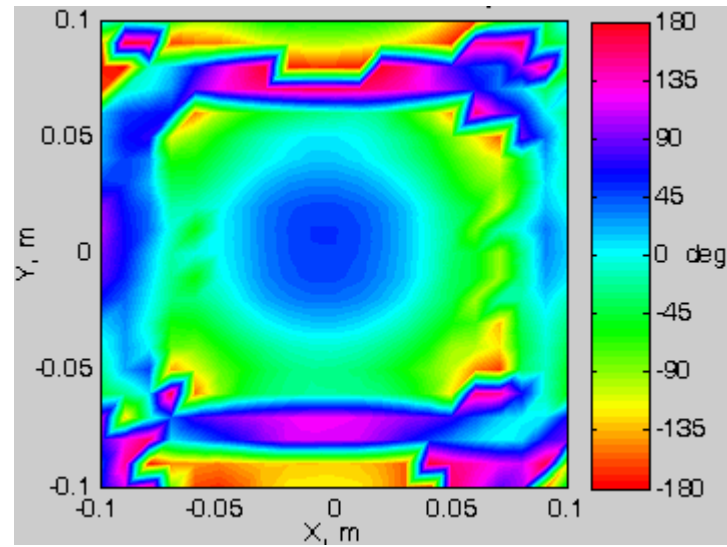
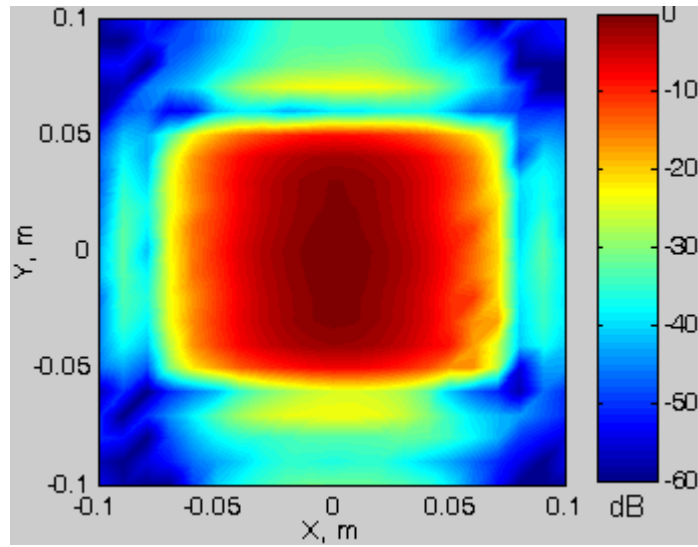
$$z_2=0.29 \text{ м}$$



$$\Pi(x, y) = \begin{cases} 1, & (x, y) \in \mathfrak{R} \\ 0, & (x, y) \notin \mathfrak{R} \end{cases}$$

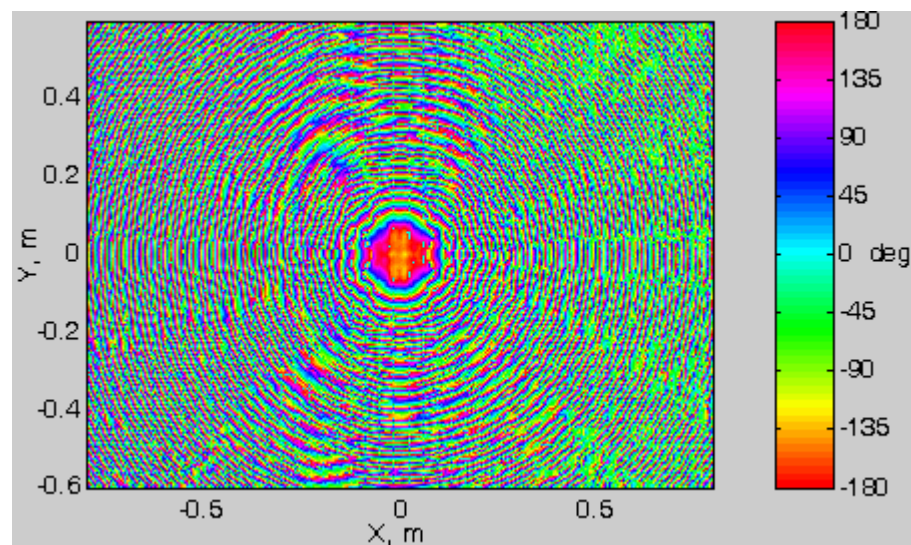
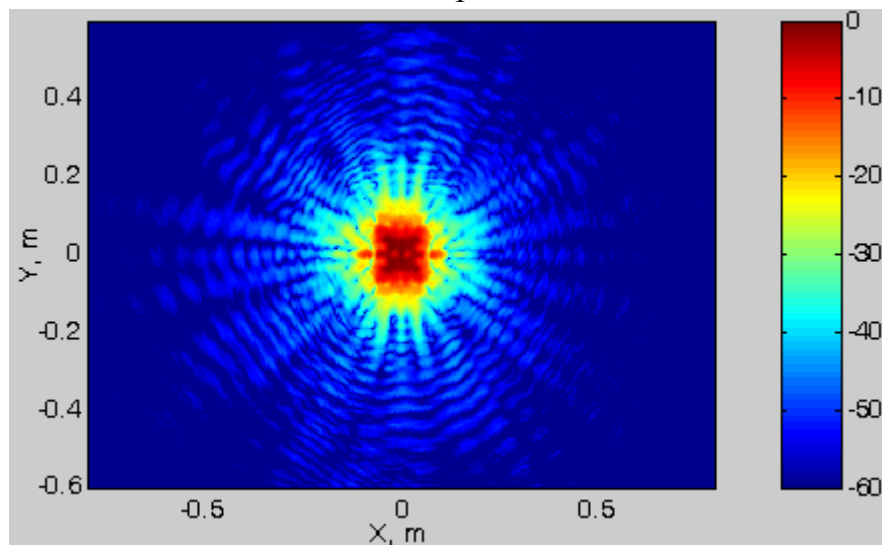


$z=0$



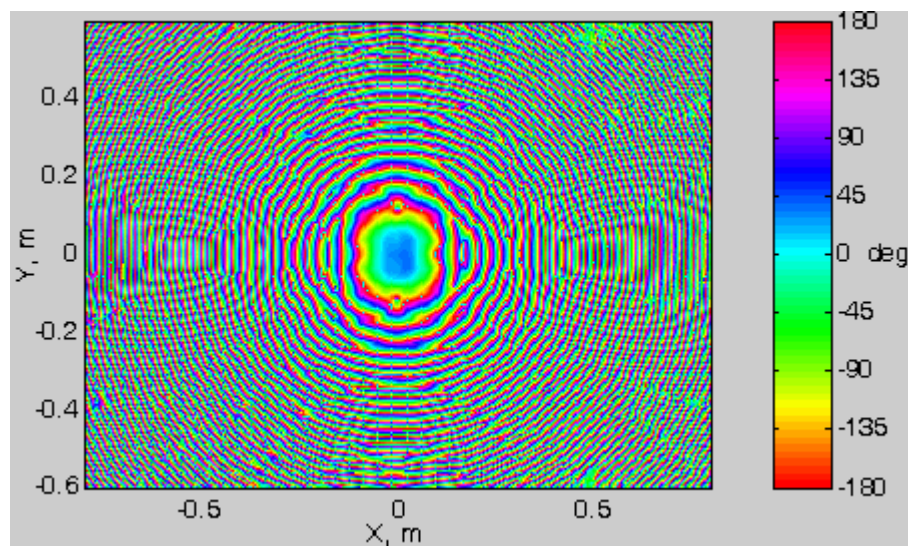
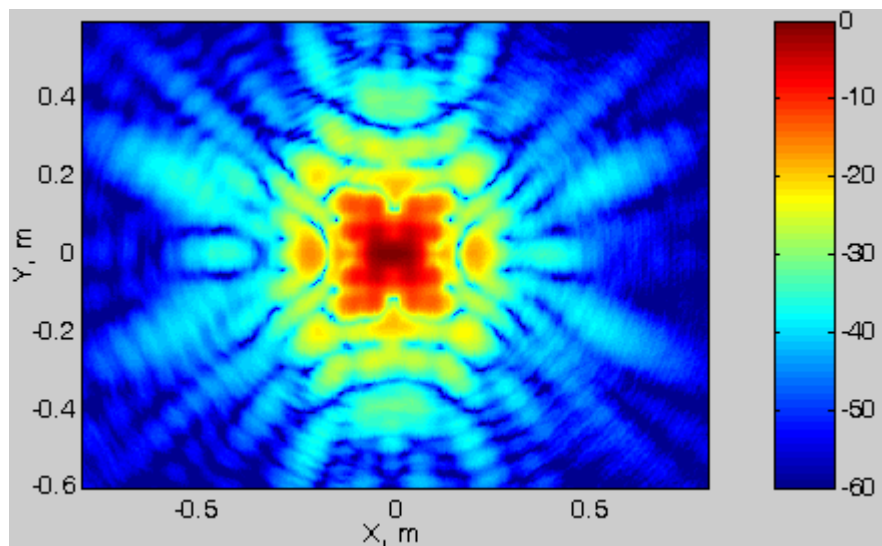
$f=20 \text{ ГГц}$

$z_1=0.112 \text{ м}$

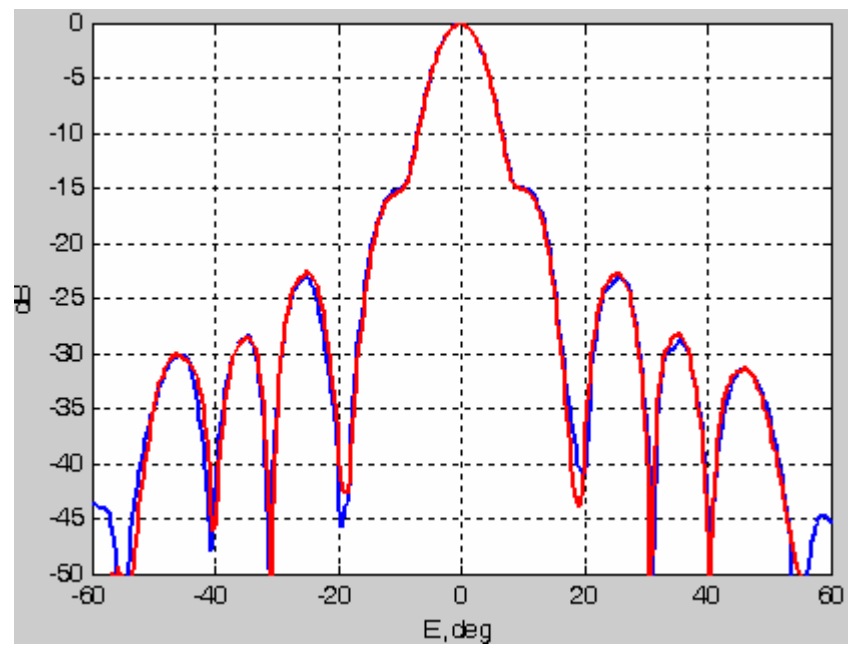
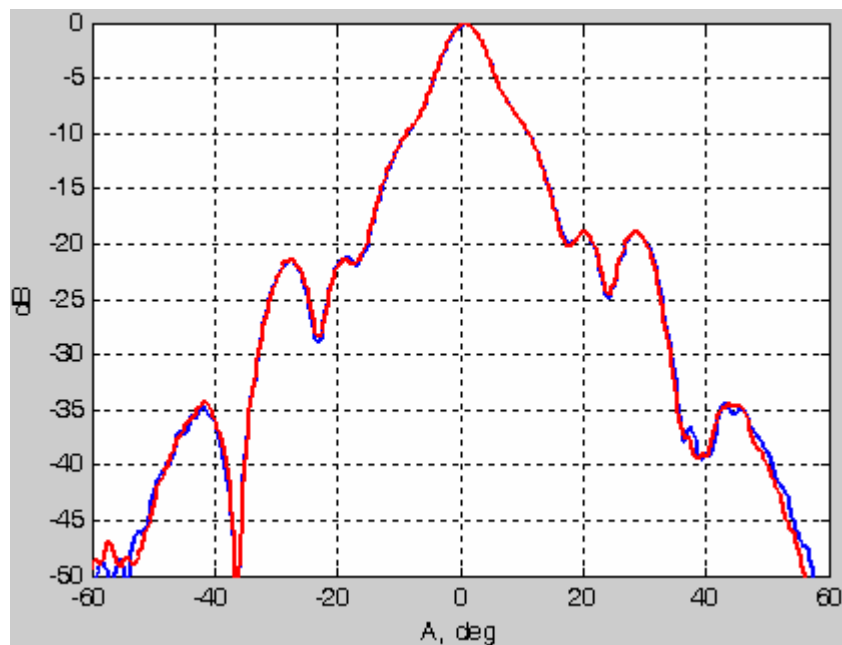
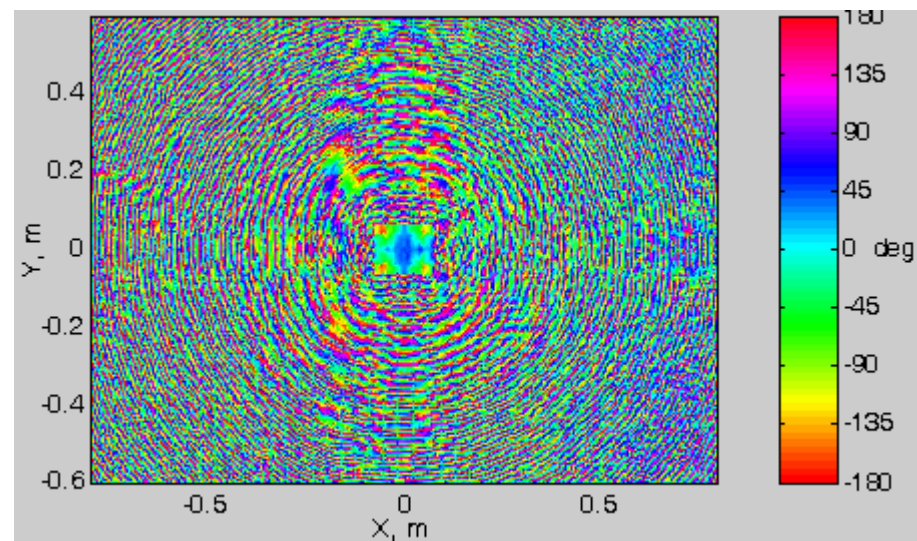
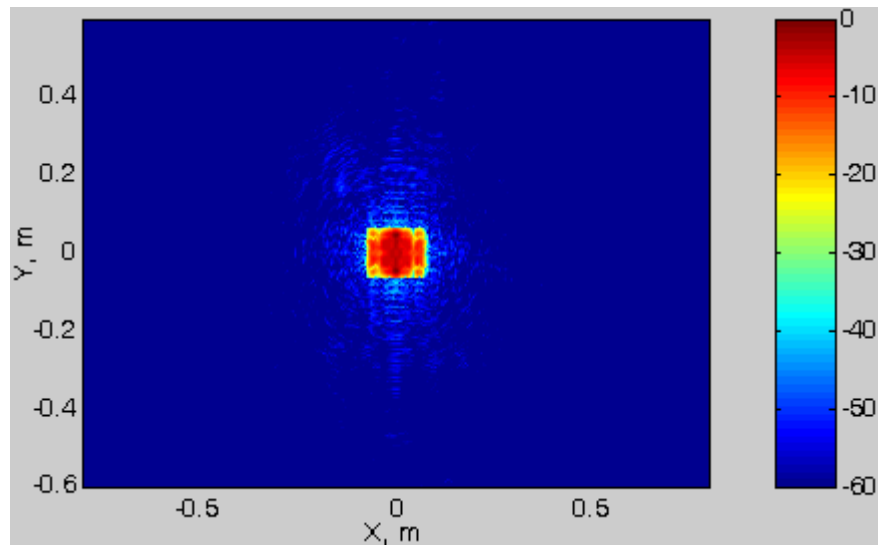


$z_2=0.375 \text{ м}$

$z_2-z_1=17.5\lambda$

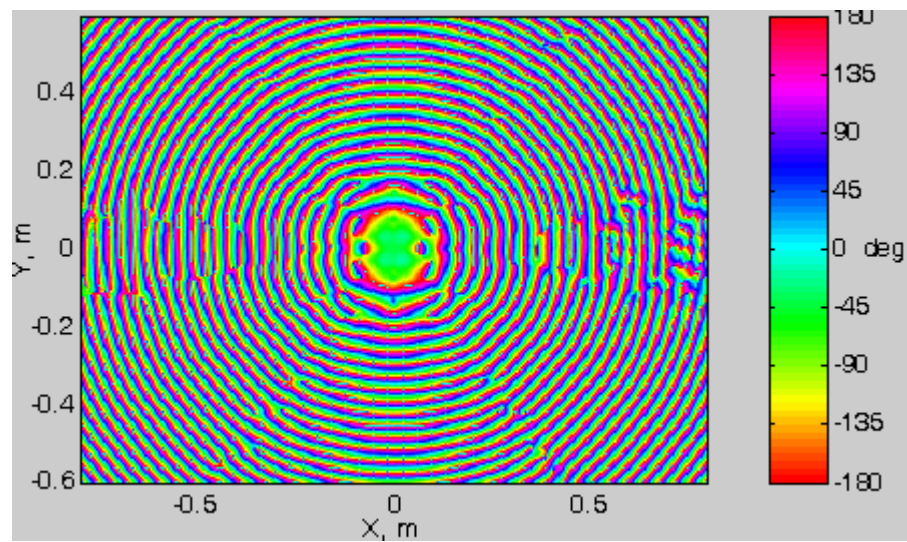
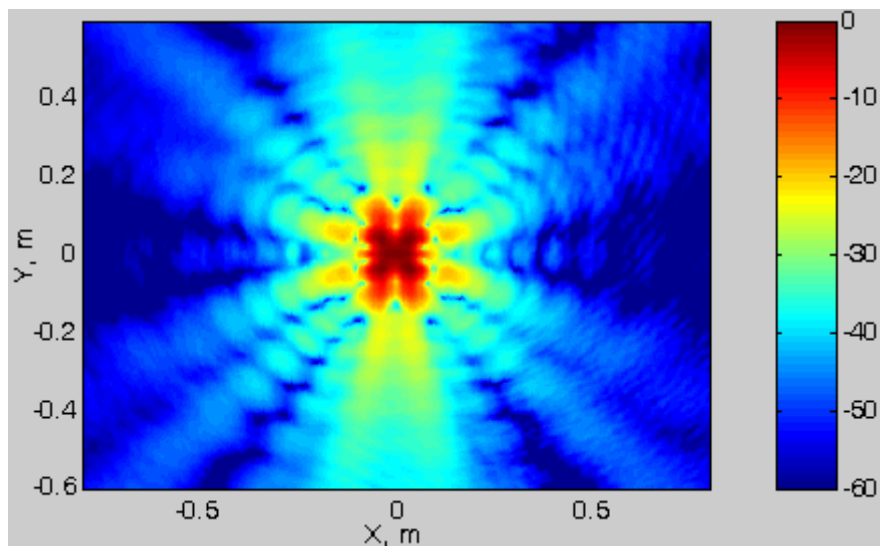


$z=0$ $n=100$



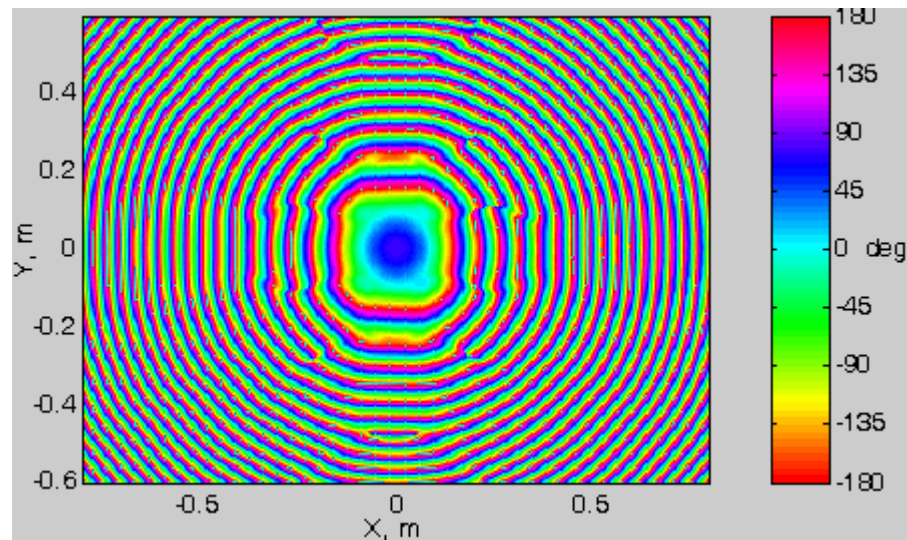
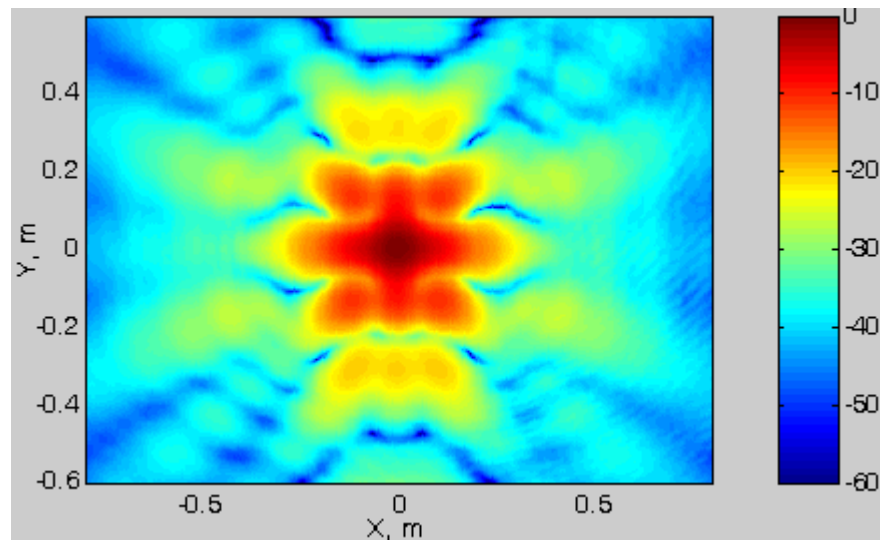
$f=10 \text{ ГГц}$

$z_1=0.112 \text{ м}$



$z_2=0.375 \text{ м}$

$z_2-z_1=8.75\lambda$



$z=0$ $n=100$

