

研究報告

15/10/09

徳島大学 安井研究室 M1
小川 貴之

変調周波数の決定

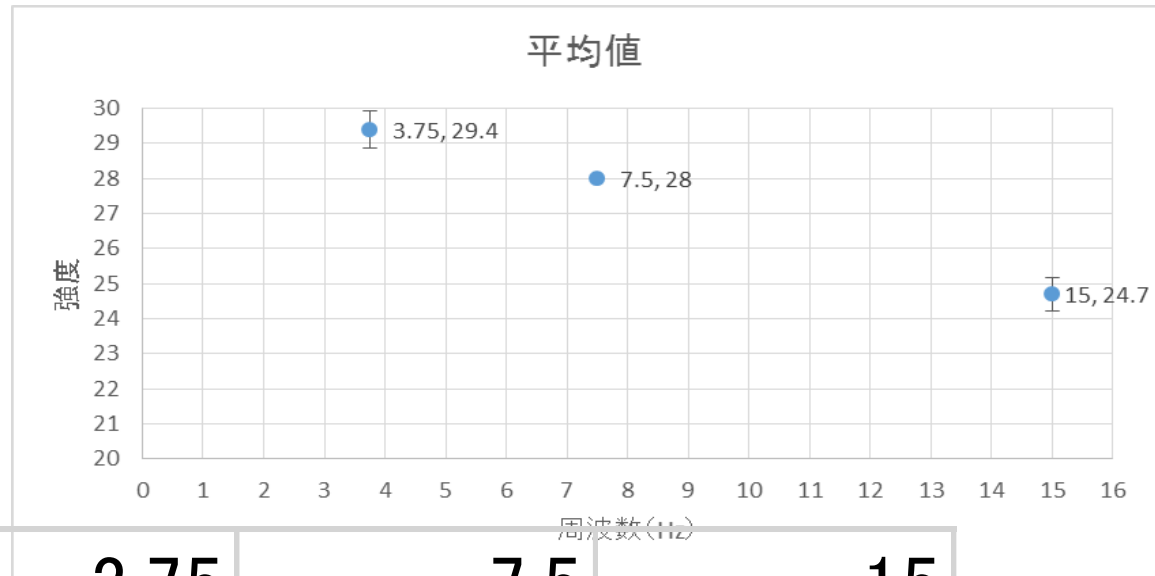
各周波数ごとに10枚の画像を取得し
T検定を行った(p値は0.01とした)

積算回数

15 Hzのとき128回

7.5 Hzのとき64回

3.75 Hzのとき32回



周波数	3.75	7.5	15
平均値	29.4	28	24.7
標準偏差	0.516398	0	0.483046
S/N	56.93286	#DIV/0!	57.96551

Principle of numerical reconstruction algorithms

$$U(x, y, z) = F^{-1}\{F\{U(x, y, 0)\}H_R(f_x, f_y, z)\}$$

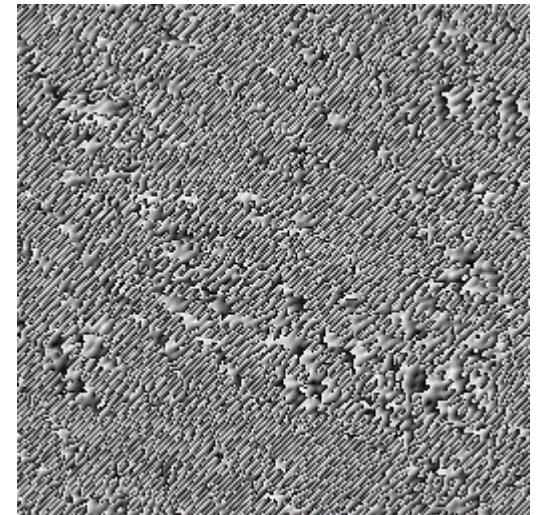
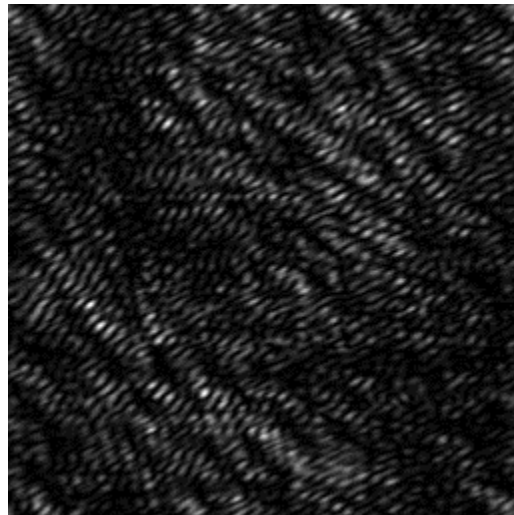
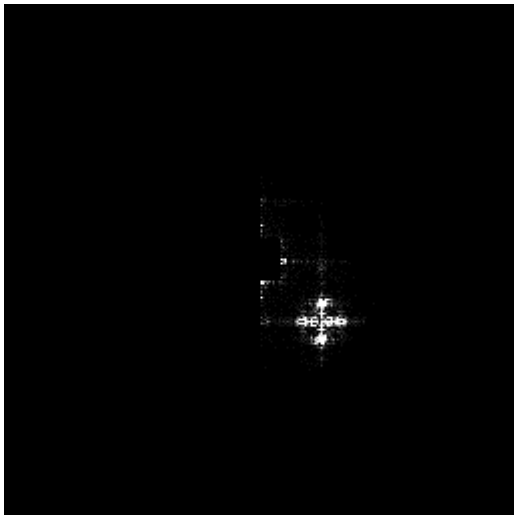
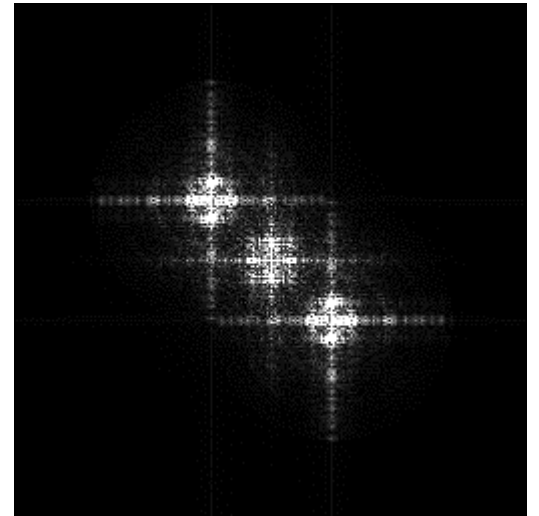
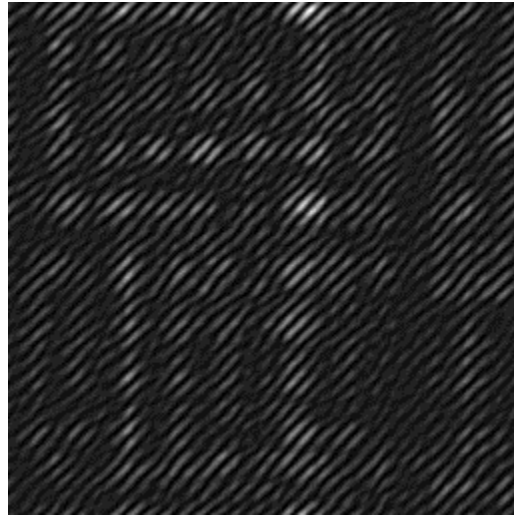
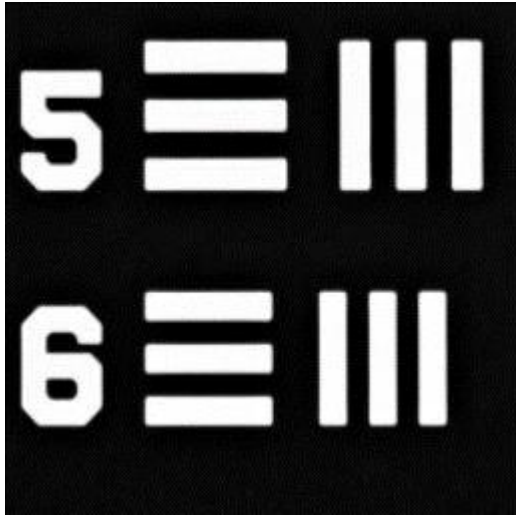
Fresnel angular spectrum (FAS) algorithm

$$H_F(f_x, f_y, z) = \exp\left\{ikd \left[1 - \frac{\lambda^2}{2}(f_x^2 + f_y^2)\right]\right\}$$

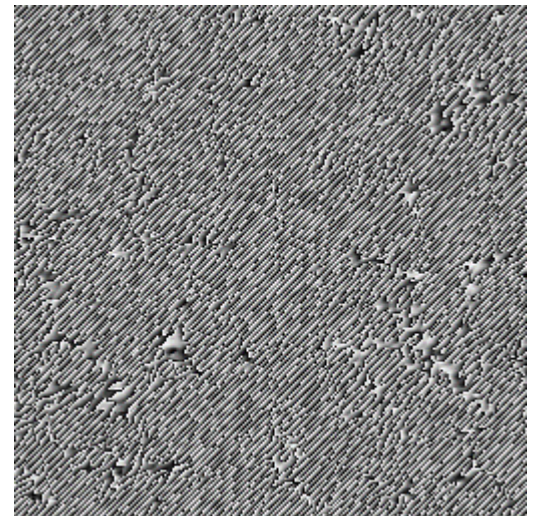
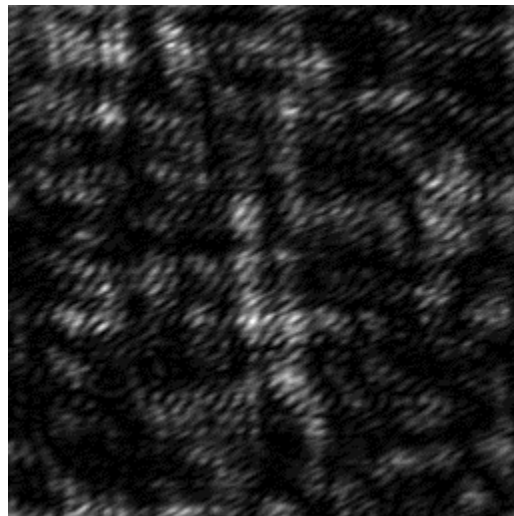
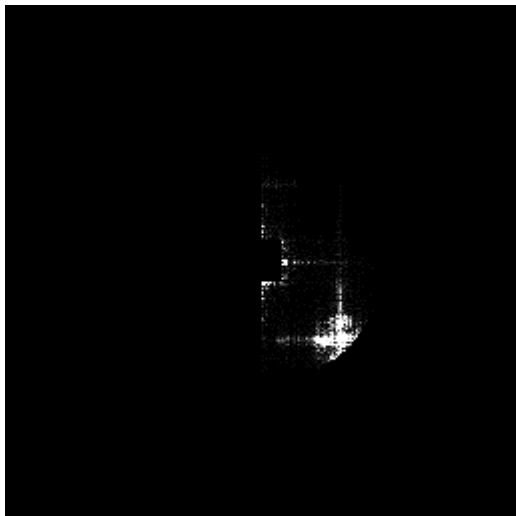
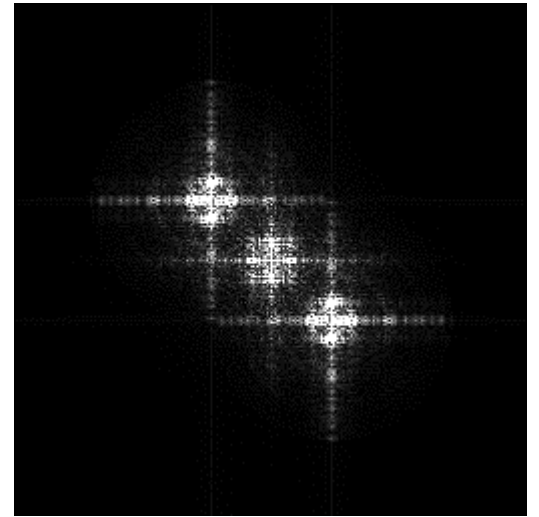
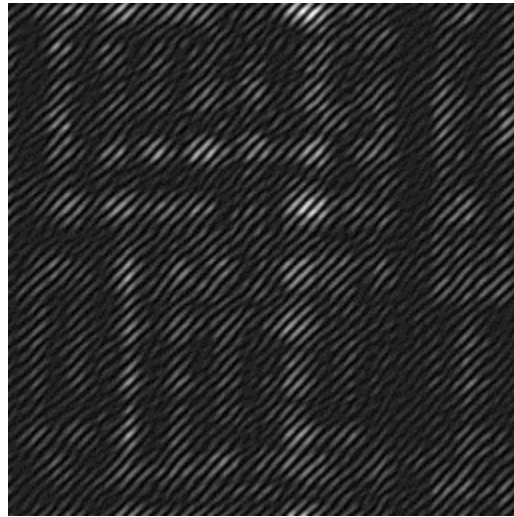
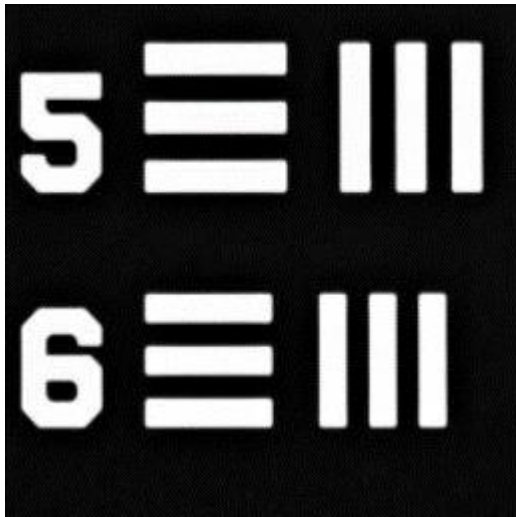
Angular spectrum algorithm

$$H_A(f_x, f_y, z) = \exp\left(i\frac{2\pi}{\lambda}z\sqrt{1 - \lambda^2f_x^2 - \lambda^2f_y^2}\right)$$

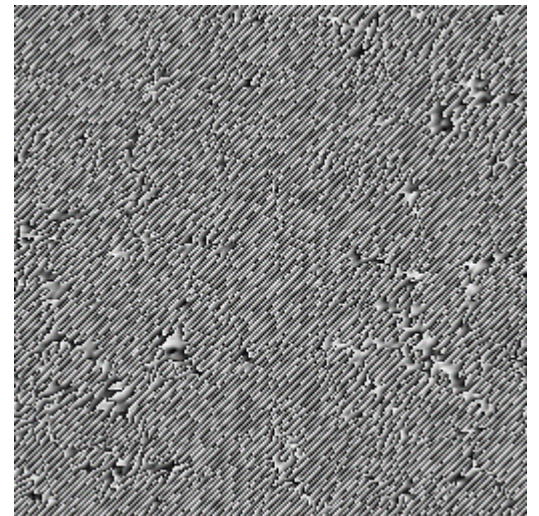
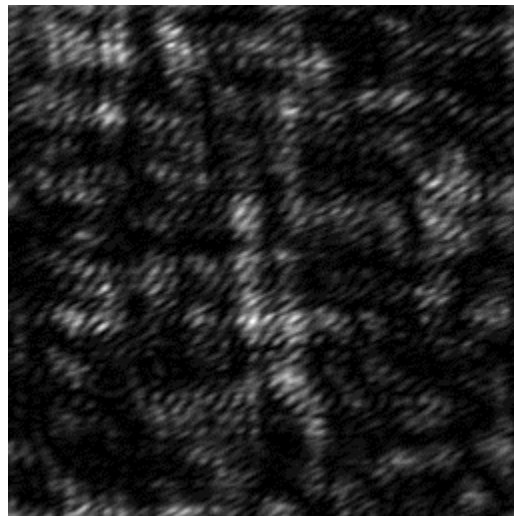
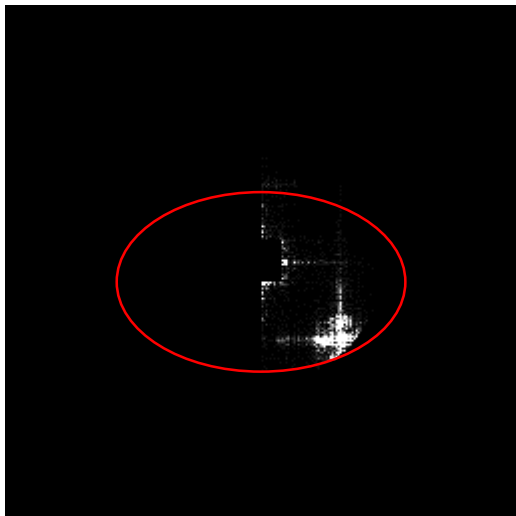
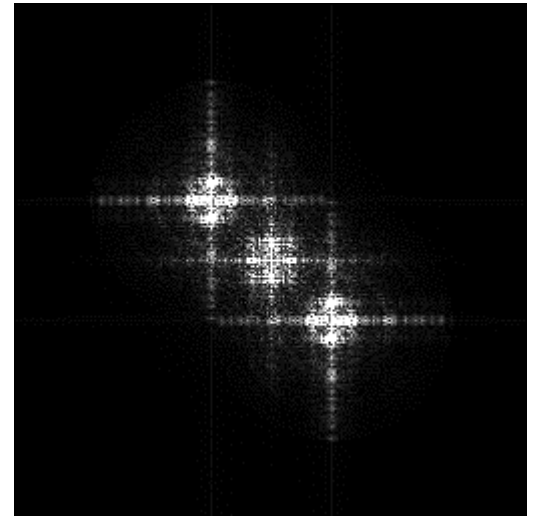
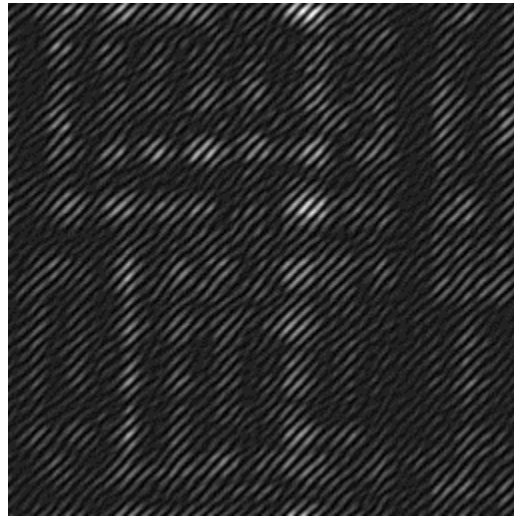
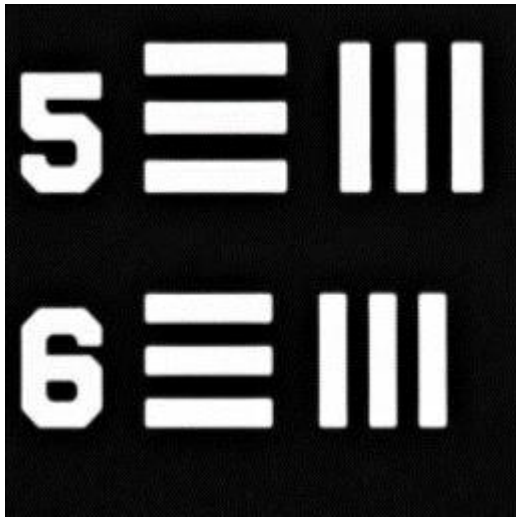
シミュレーションプログラムASM



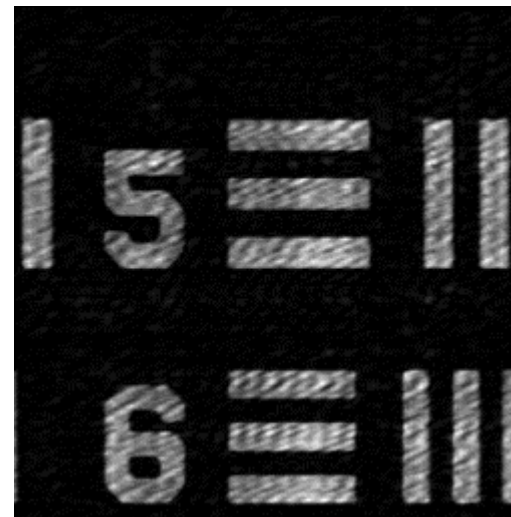
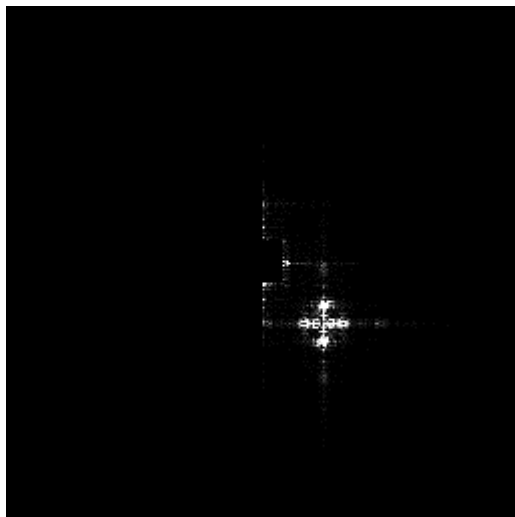
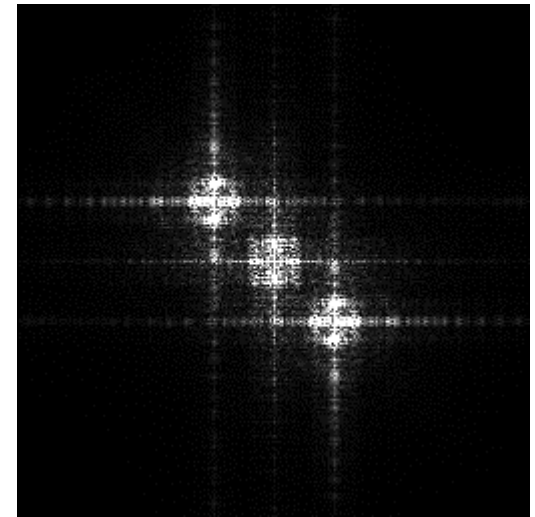
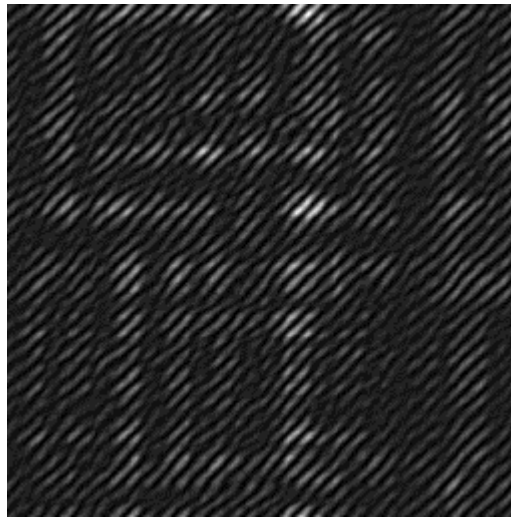
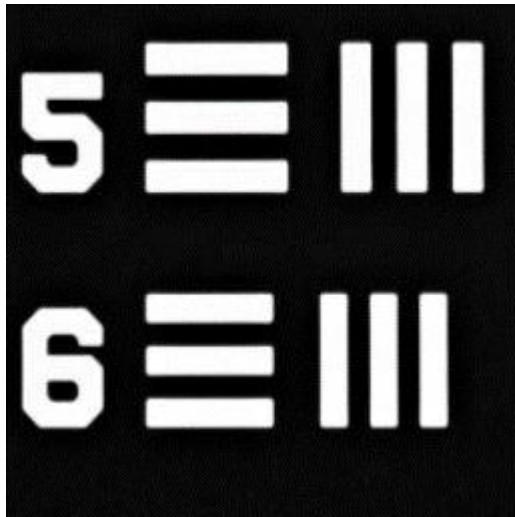
シミュレーションプログラムASM



シミュレーションプログラムASM



シミュレーションプログラムFAS



問題

ASM

再構成できない

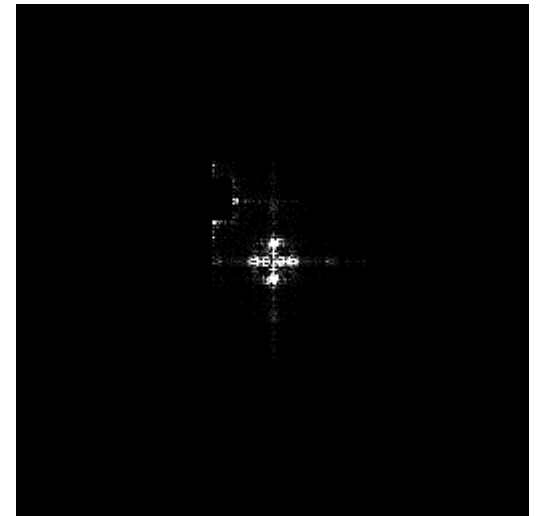
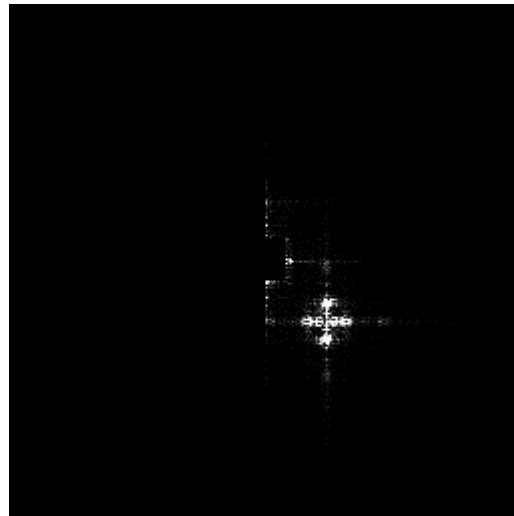
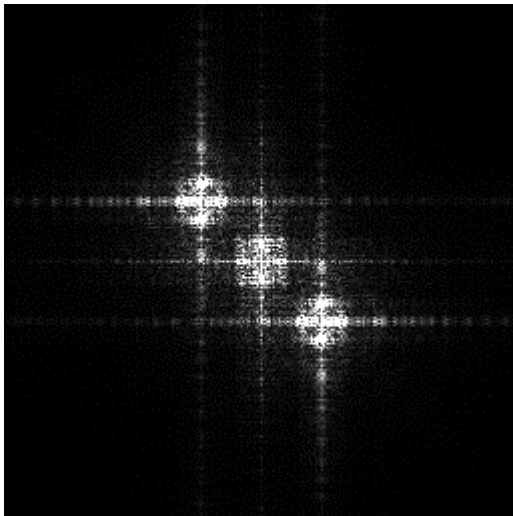
オフアクシス角が大きいと位相を掛けた後のスペクトル画像がおかしい

FAS

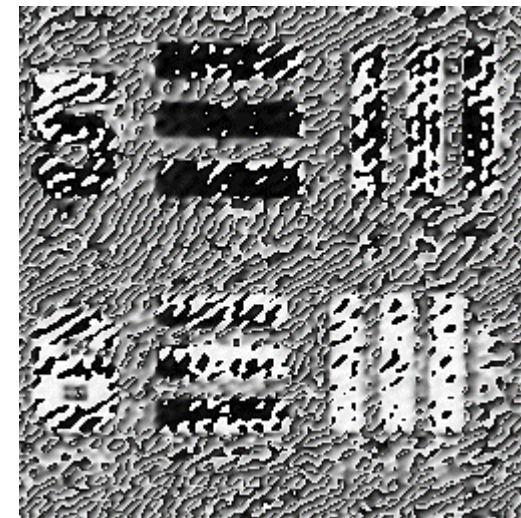
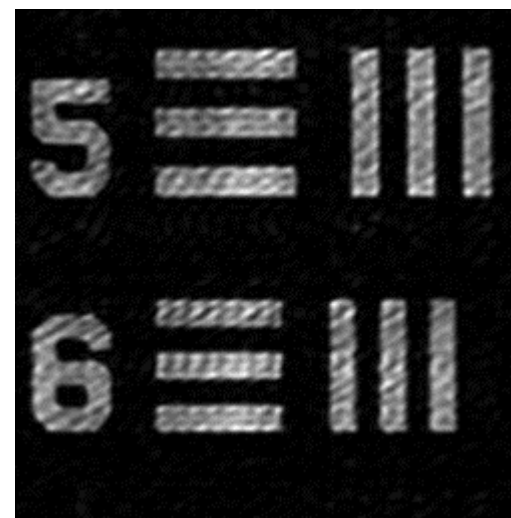
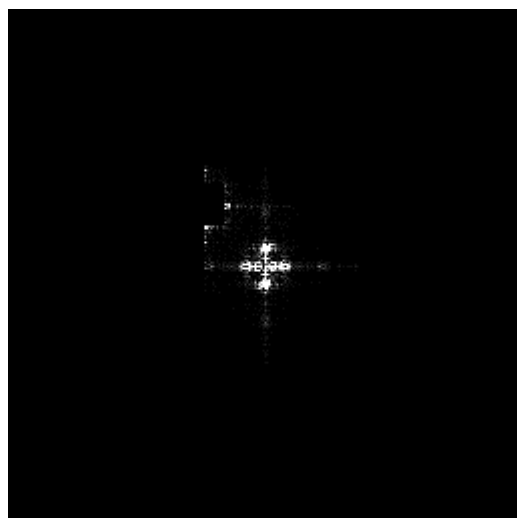
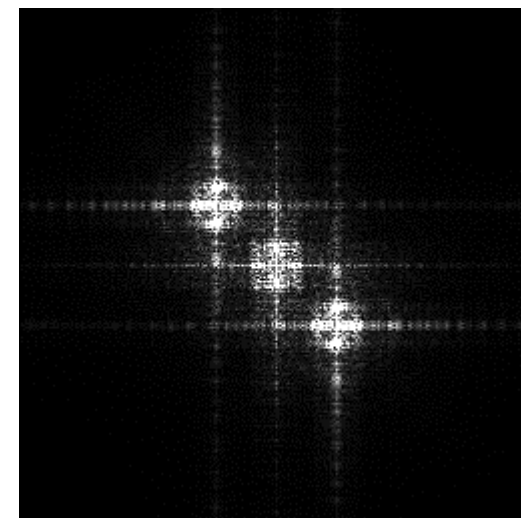
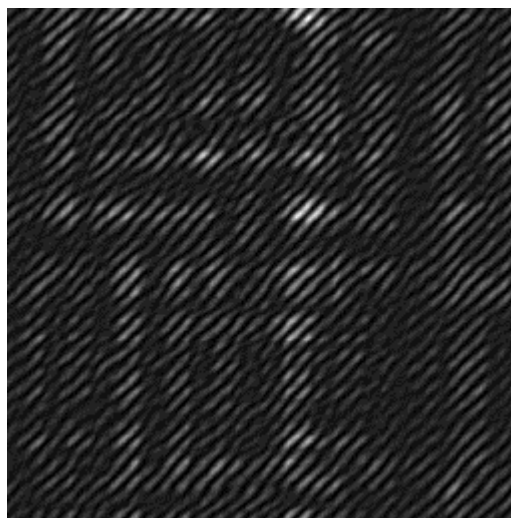
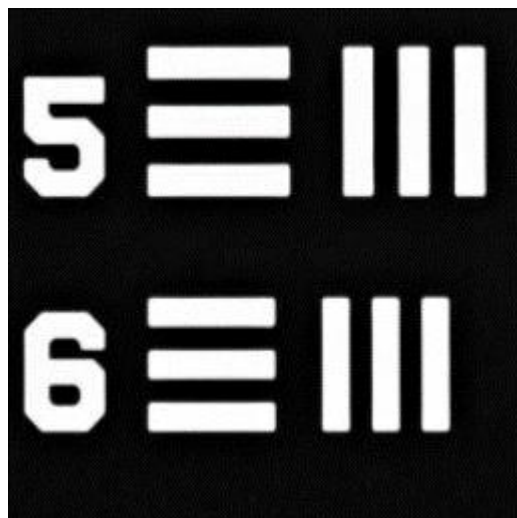
再構成像のポジションがおかしい

解決法

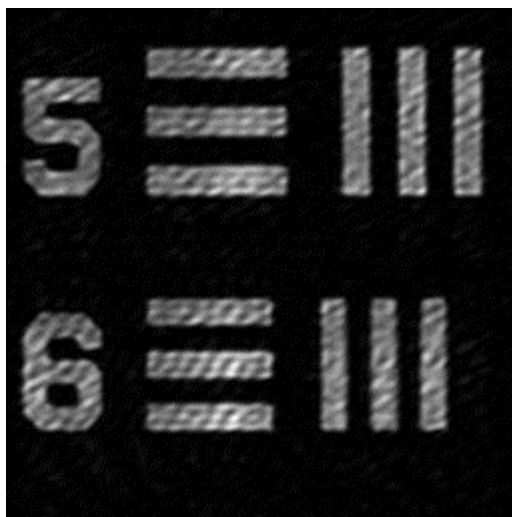
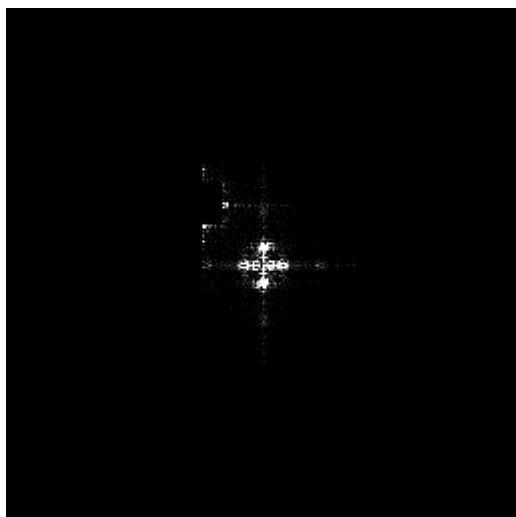
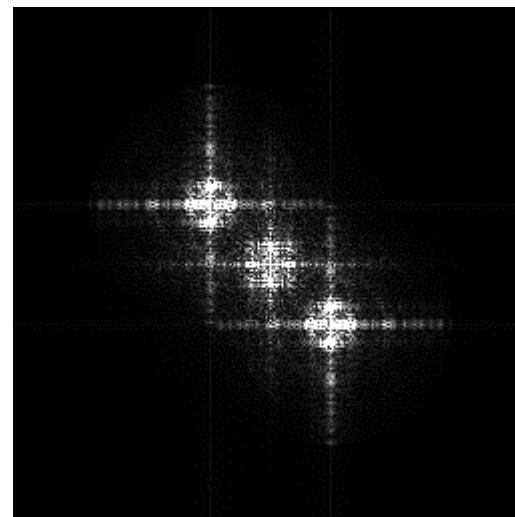
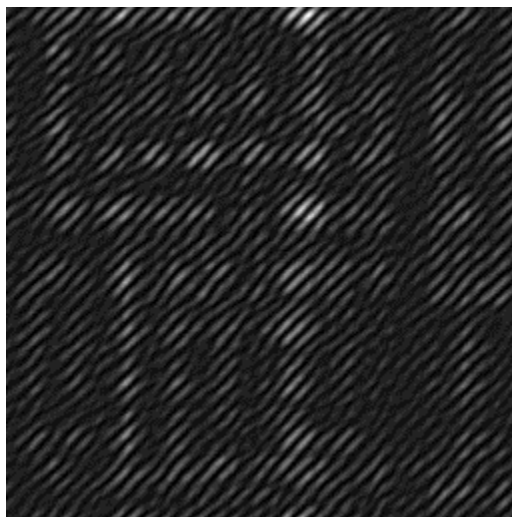
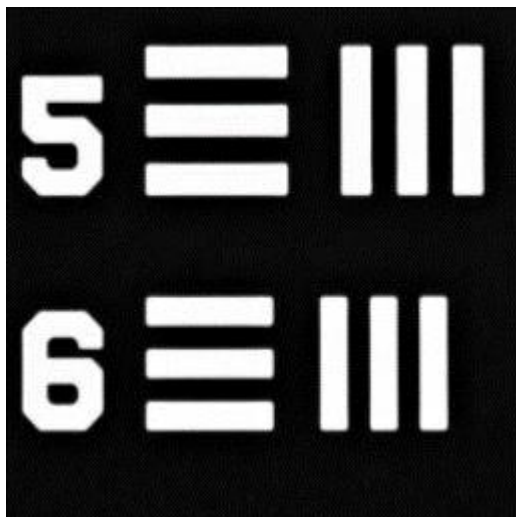
位相を掛けた後に物体光の成分を中央付近に移動させた



シミュレーションプログラムFAS

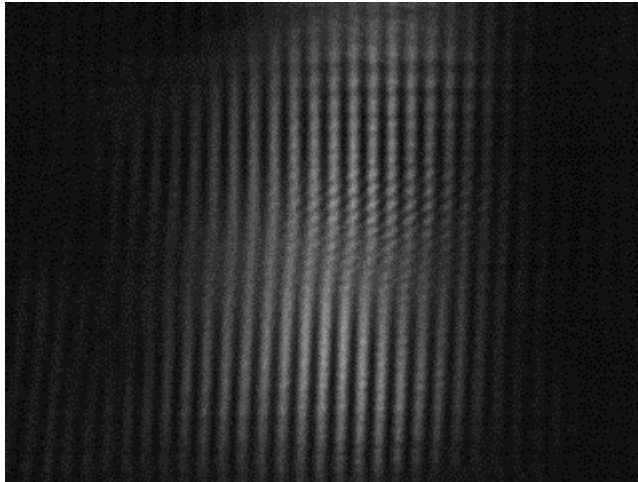


シミュレーションプログラムASM



実験

79.97 μm



107 μm

