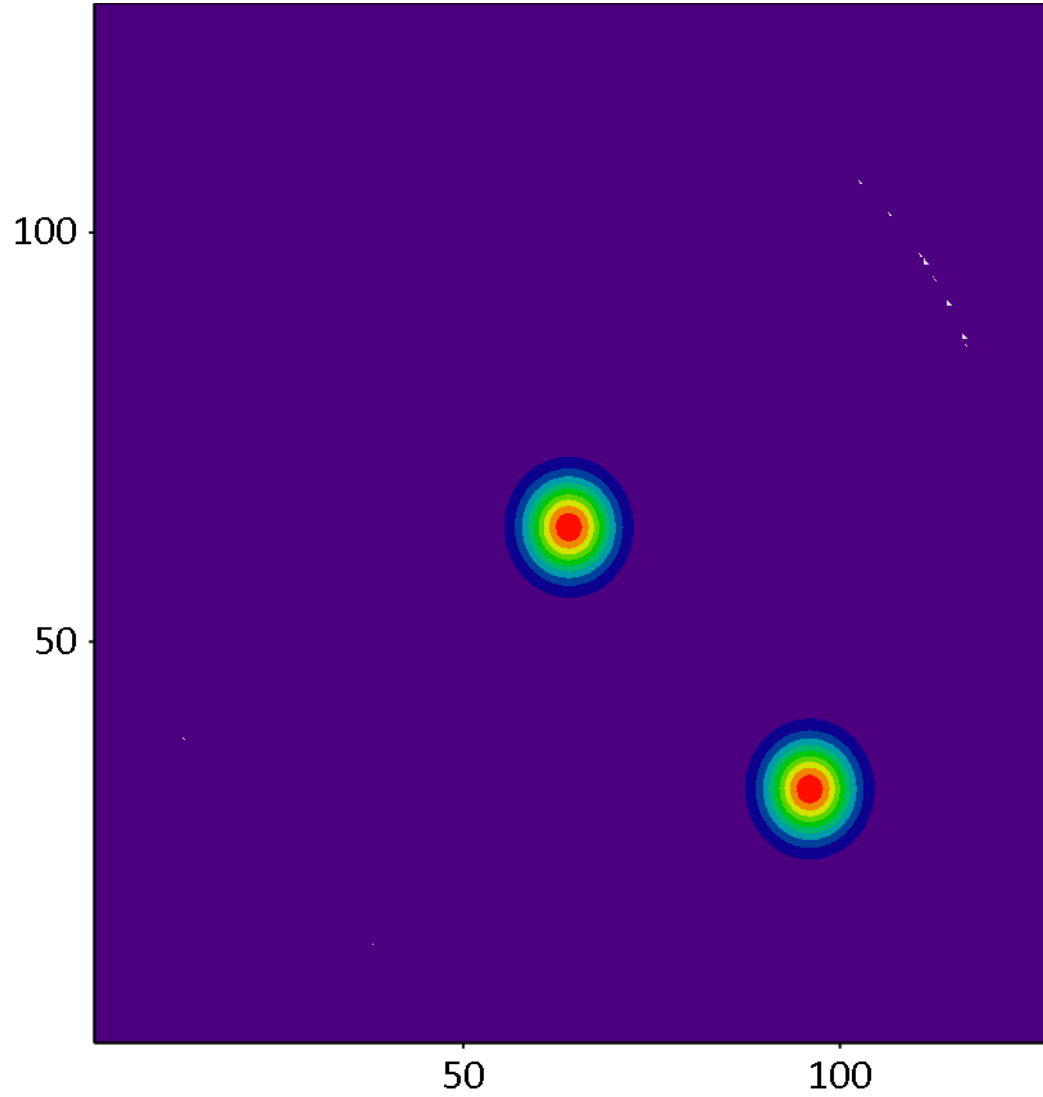


## Original Matrix

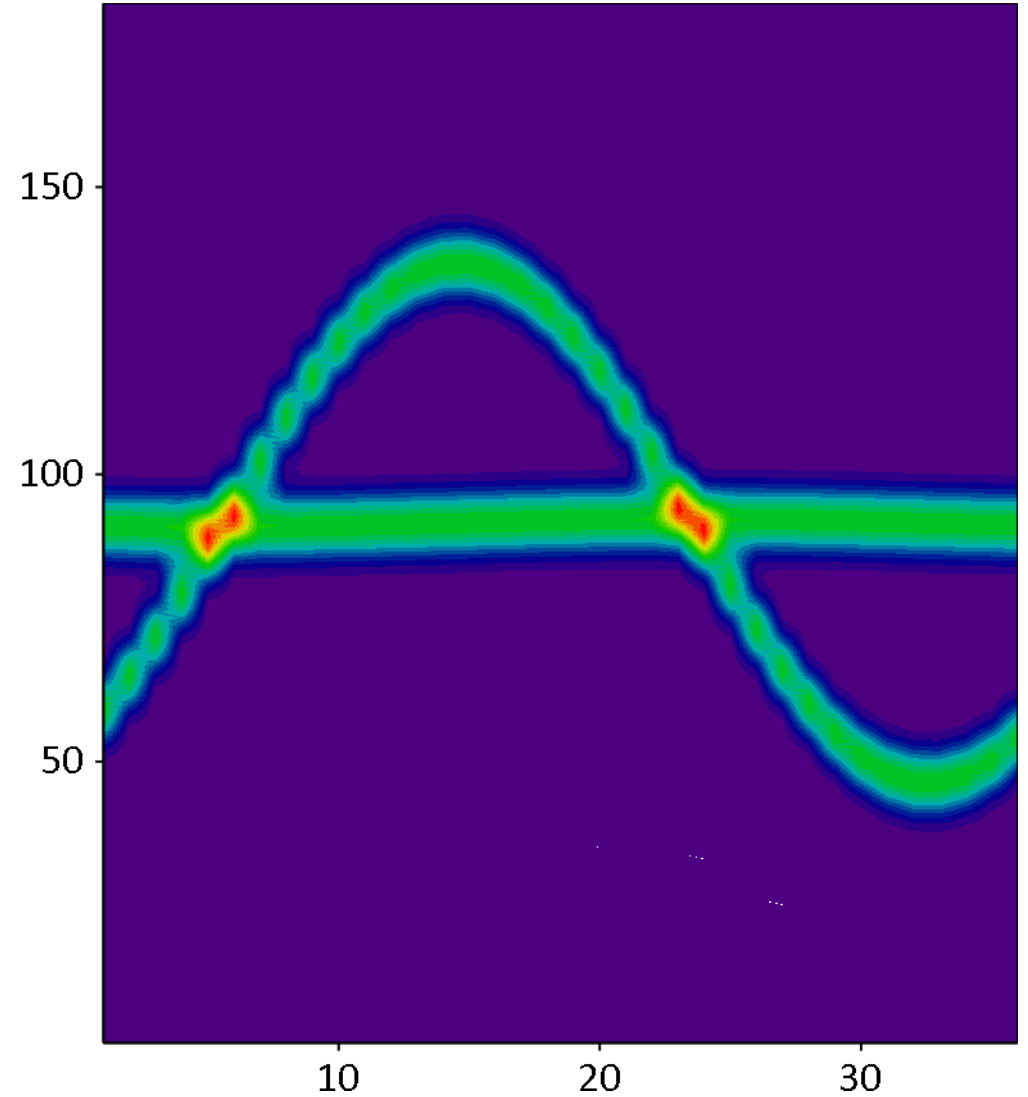
```
OM := READPRN("t2.mtx")
```



OM

## Sinogram

```
SM := READPRN("t2.sin")
```

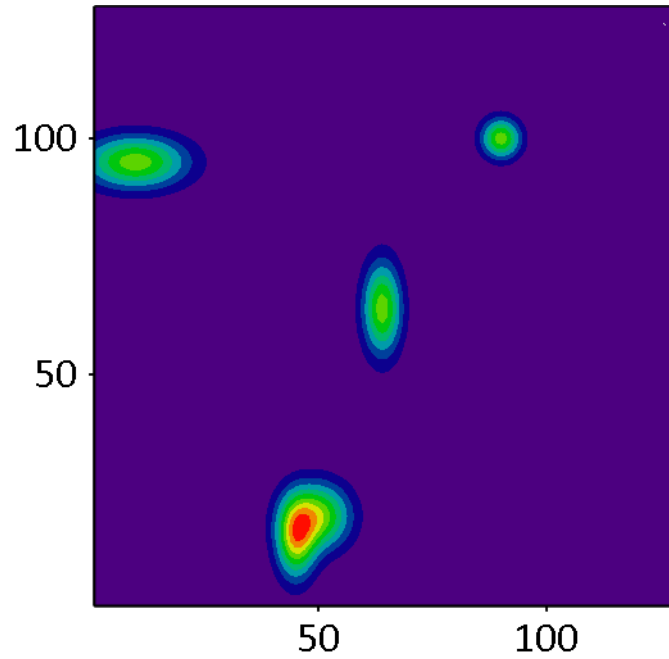


SM

# Algebraic Reconstruction Technique

## Original Matrix

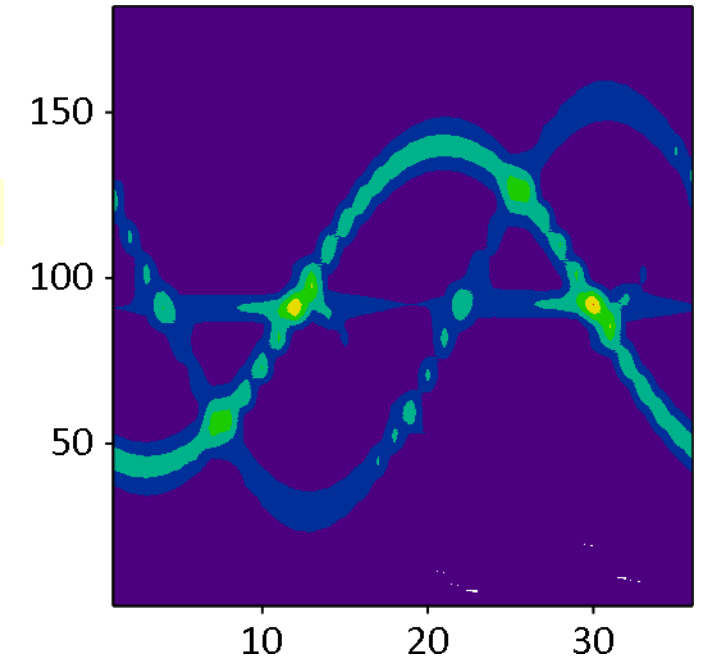
```
O1 := READPRN("t5.mtx")
```



O1

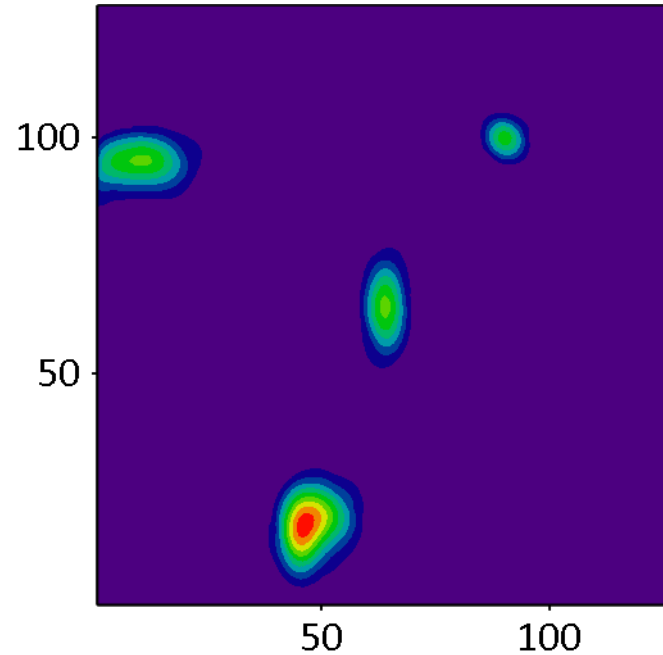
## Sinogram

```
S1 := READPRN("t5.sin")
```



S1

```
RM := READPRN("t5_ART_1.mtx")
```



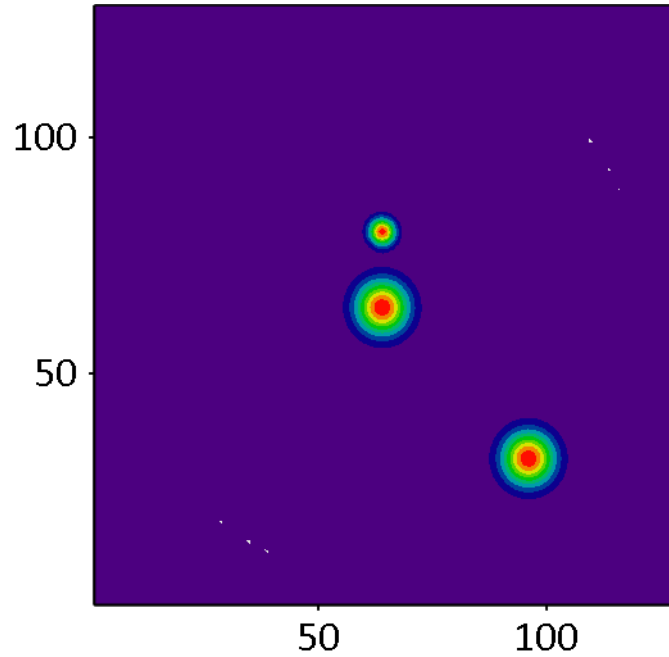
RM

Reconstructed with the Algebraic Reconstruction Technique

## BackProjection Method

### Original Matrix

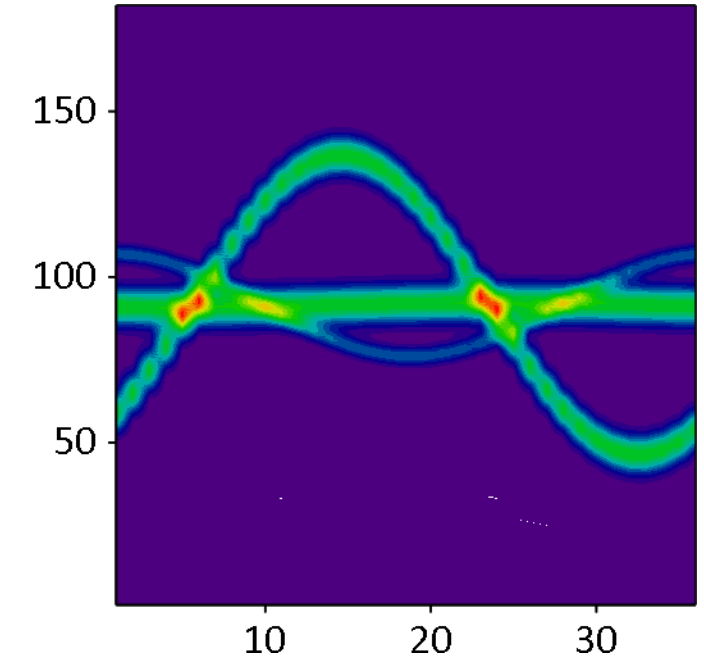
```
MM := READPRN("t3.mtx")
```



MM

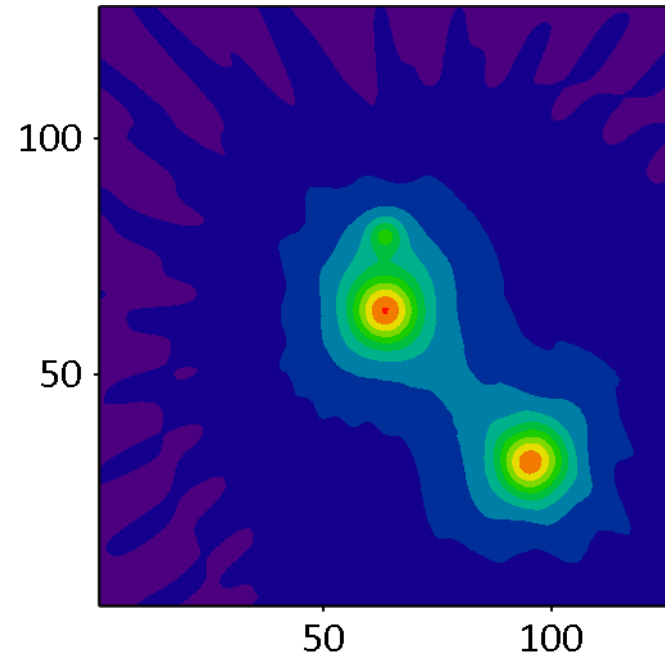
### Sinogram

```
SN := READPRN("t3.sin")
```



SN

```
BM := M_Recon(128, SN)
```



BM

Reconstructed with the BackProjection Method

Pix\_Recon(Ix, Iy, NN, MS) :=

NP ← rows(MS)

NR ← cols(MS)

The\_Step ←  $\frac{2\pi}{NP}$

Sum ← 0.0

for i ∈ 1 .. NP

    The ← The\_Step · (i - 1)

    IR ←  $\left( Ix - \frac{NN}{2} \right) \cdot \cos(\text{The}) + \left( Iy - \frac{NN}{2} \right) \cdot \sin(\text{The})$

    IR ← IR + 0.50 · NR + 0.50

    RW ← |cos(The)| + |sin(The)|

    IRL ← IR - 0.50 · RW

    IRH ← IR + 0.50 · RW

    S1 ← 1 - (IRL - floor(IRL))

    J1 ← floor(IRL)

    S2 ← IRH - floor(IRH)

    J2 ← floor(IRH)

    J1 ← max(1, J1)

```
J2 ← min(J2 , NR)
```

```
Sum ← Sum + S1 · MSi , J1 + S2 · MSi , J2
```

```
Sum ← Sum + 1 MSi , J1+1   if   (J2 - J1) = 2
```

```
Pix_Recon ← Sum
```

```
return Pix_Recon
```

```
M_Recon(NN , MS) :=
```

```
  for i ∈ 1 .. NN
```

```
    for j ∈ 1 .. NN
```

```
      M_Reconi , j ← Pix_Recon(j , i , NN , MS)
```

```
  return M_Recon
```