Problem APS02: Optimal reconstruction of very noisy data
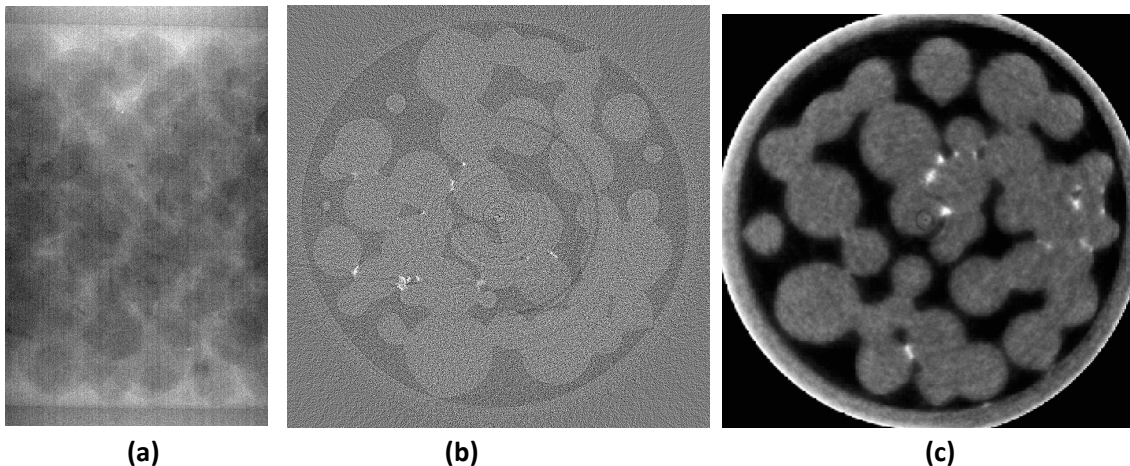

| (a) | (b) | (c) |

Figure 1: Glass Pheres: (a) very noisy (less than 10 counts) projection of glass spheres, (b) reconstruction using gridrec and with an iterative method (c) using a priori knowledge about the sample.

Challenge:

When collecting tomographic data of fast evolving samples the data collection is set the highest speed possible that is compatible with sample and its environment. Often the exposure time is very short and not optimal generating very noisy data. Here we are looking at reconstruction methods that can use a-priory knowledge about the sample to improve the reconstruction quality when projections are very noisy.

Motivation:

Perform fast tomographic scan obtaining good quality reconstruction from very noisy data.

Previous work / relevant literature:

   (1)

Example dataset :

Raw data and tomoPy script location to generate the reconstruction in figure:

ftp://ftp.xray.aps.anl.gov/pub/tomo-databank/Lorentz/aps/noisy/

Projection data details

Data File Name:	APS_13_BM_01.h5
Energy (keV):	
ScanRange (deg):	180
TOMO_N:	900
REF_ON:	
REF_N:	20
DARK_N:	none (array with zero)
Count_time (s):	
PixelSize:	1.5um

Note: if using this data set in a publication please contact:

Francesco De Carlo: decarlo@aps.anl.gov

for proper sample owner and facility credits.