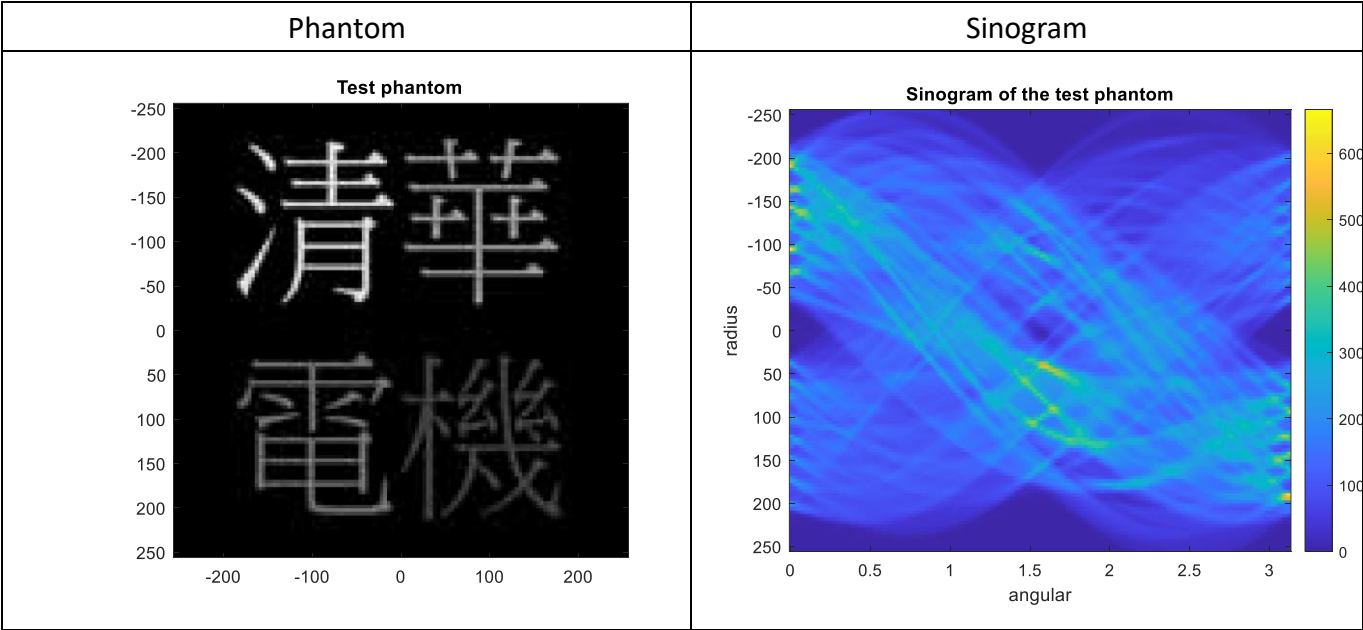
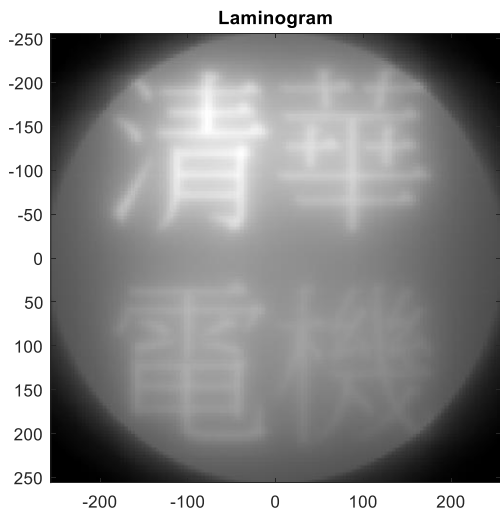


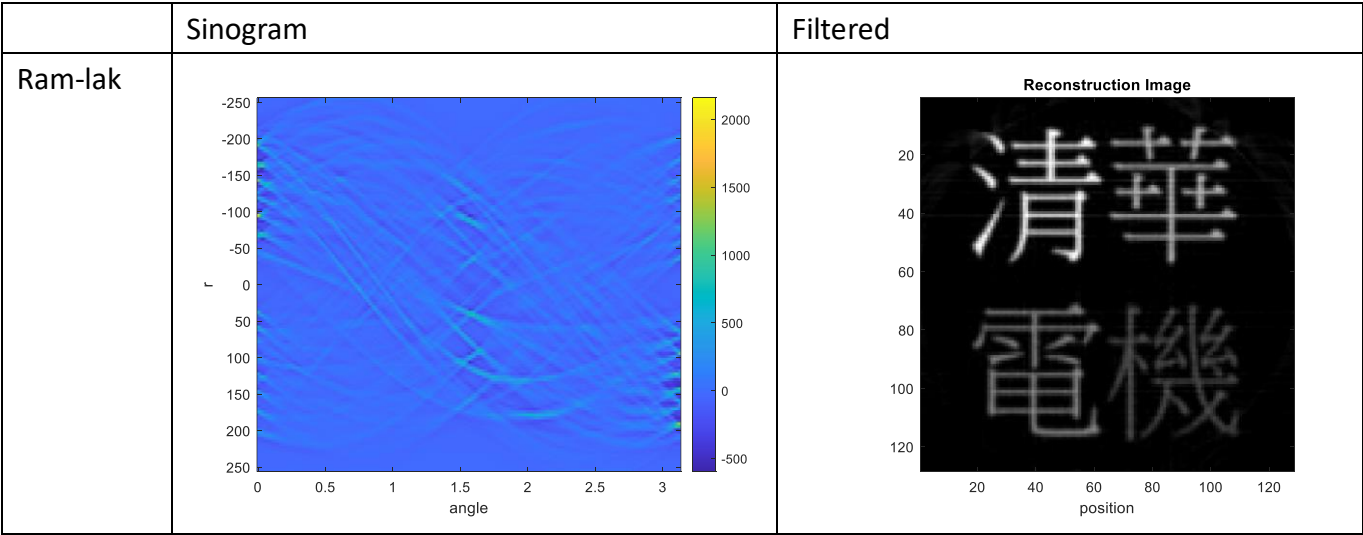
(a)

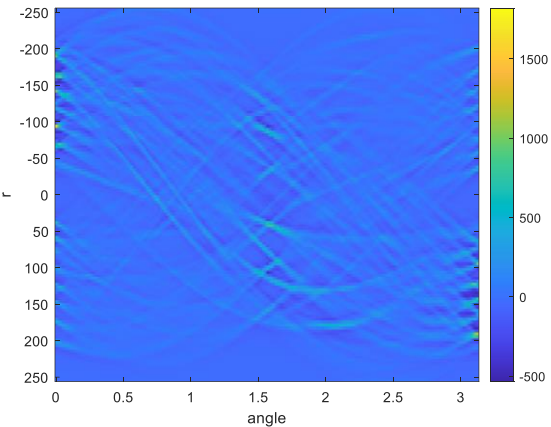
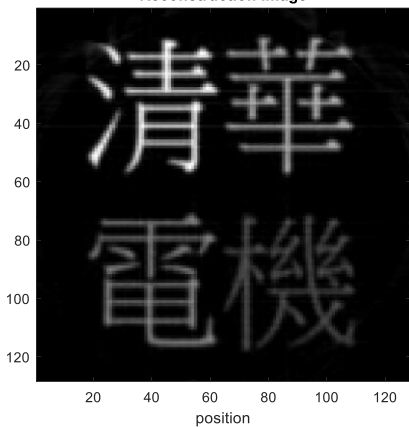
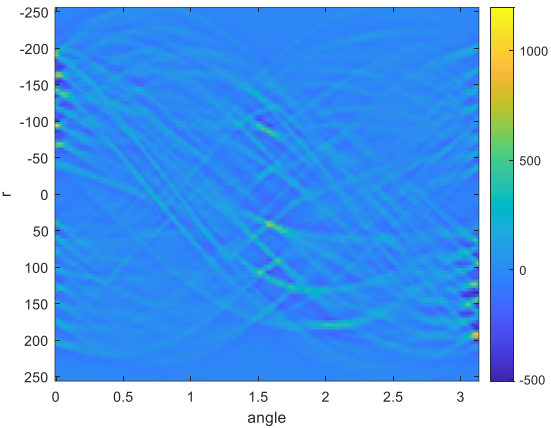
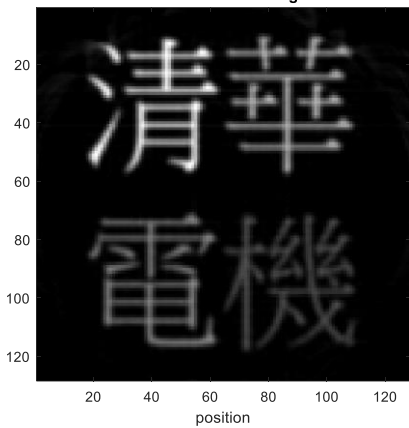
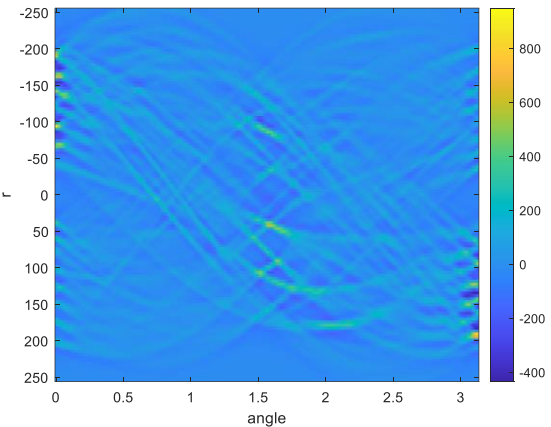
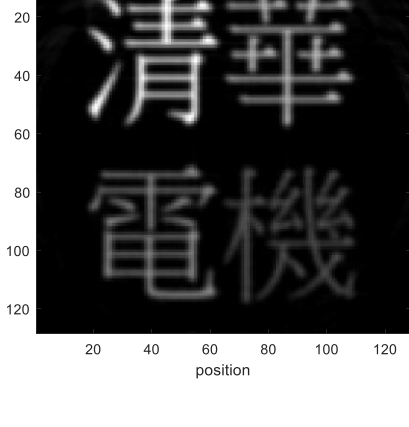
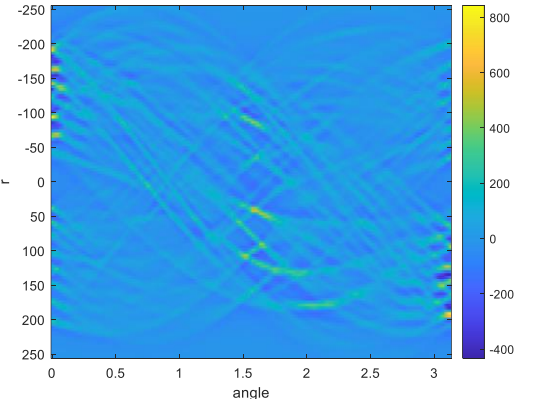
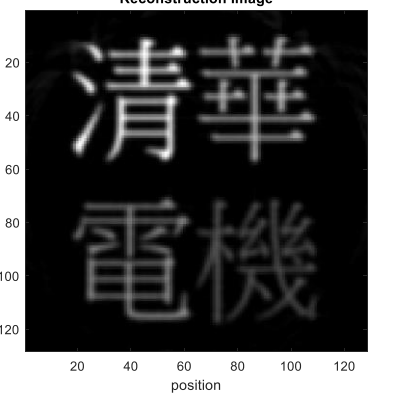


(b)



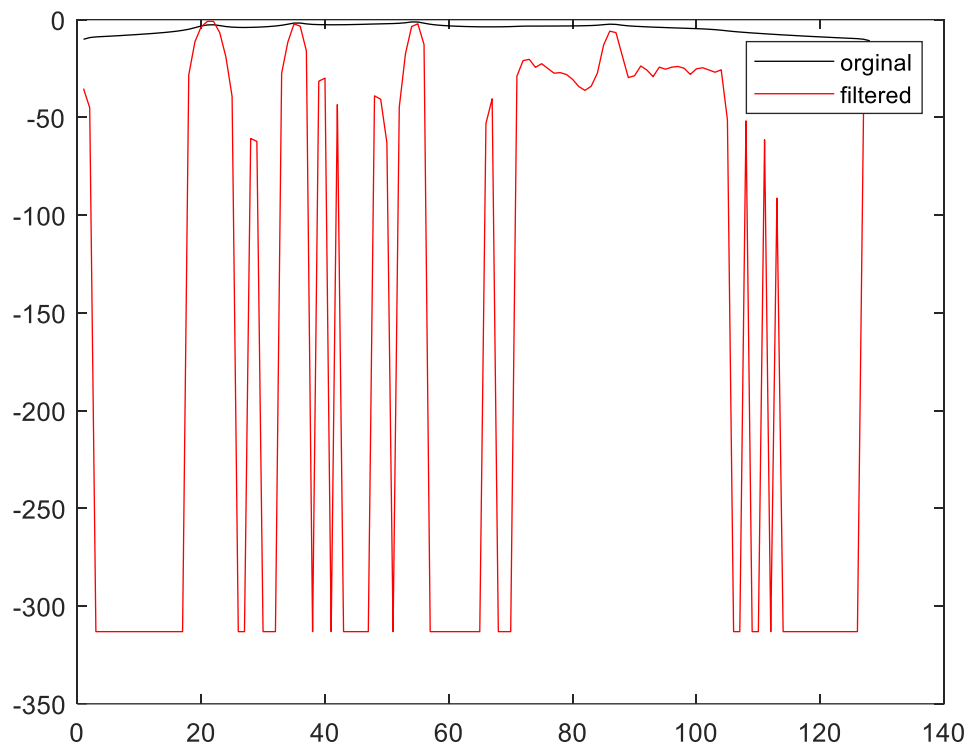
(c)(d)



Shepp-logan	 A 2D plot showing the magnitude of the Shepp-logan filter. The x-axis is labeled 'angle' and ranges from 0 to 3. The y-axis is labeled 'L' and ranges from -250 to 250. A color bar on the right indicates values from -500 to 1500.	 A reconstruction image titled 'Reconstruction Image' showing the Chinese characters '清華' (Tsinghua) and '電機' (Electrical Engineering) on a black background. The x-axis is labeled 'position' and ranges from 20 to 120. The y-axis ranges from 20 to 120.
Cosine	 A 2D plot showing the magnitude of the Cosine filter. The x-axis is labeled 'angle' and ranges from 0 to 3. The y-axis is labeled 'L' and ranges from -250 to 250. A color bar on the right indicates values from -500 to 1000.	 A reconstruction image titled 'Reconstruction Image' showing the Chinese characters '清華' (Tsinghua) and '電機' (Electrical Engineering) on a black background. The x-axis is labeled 'position' and ranges from 20 to 120. The y-axis ranges from 20 to 120.
Hamming	 A 2D plot showing the magnitude of the Hamming filter. The x-axis is labeled 'angle' and ranges from 0 to 3. The y-axis is labeled 'L' and ranges from -250 to 250. A color bar on the right indicates values from -400 to 800.	 A reconstruction image titled 'Reconstruction Image' showing the Chinese characters '清華' (Tsinghua) and '電機' (Electrical Engineering) on a black background. The x-axis is labeled 'position' and ranges from 20 to 120. The y-axis ranges from 20 to 120.
hann	 A 2D plot showing the magnitude of the hann filter. The x-axis is labeled 'angle' and ranges from 0 to 3. The y-axis is labeled 'L' and ranges from -250 to 250. A color bar on the right indicates values from -400 to 800.	 A reconstruction image titled 'Reconstruction Image' showing the Chinese characters '清華' (Tsinghua) and '電機' (Electrical Engineering) on a black background. The x-axis is labeled 'position' and ranges from 20 to 120. The y-axis ranges from 20 to 120.

經過 filter 後殘留值消失，還原較正確，但不同的 filter 做出來的效果差不多

(e)



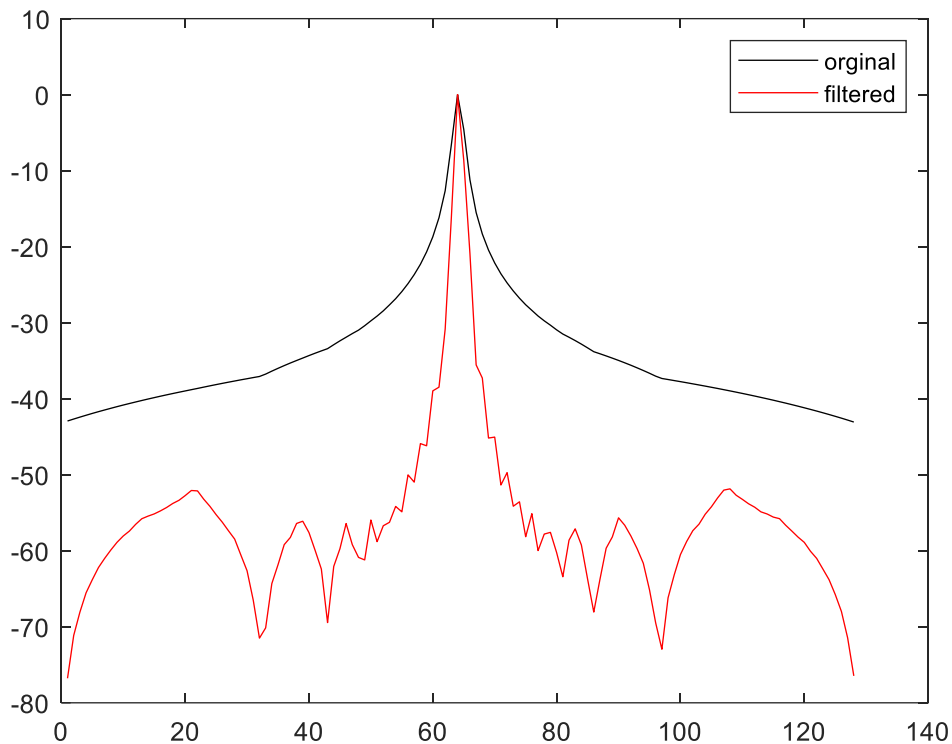
由於未使用 filter 時做 backprojection 會有殘留值，因此將 lateral projection 畫出來變化不明顯，幾乎無法判斷解析度；若使用 filter 可以發現黑白分明，可以將字體的筆劃勾勒出來，因此可以獲得解析度資訊，很明顯的經過 filter 後解析度與對比都大幅上升

(f)

將第(64,64)值設為 1 其餘為 0 當作 PSF，並且轉換成 Sinogram 並回推 laminogram 以及比較 filtered backprojection 得到的效果

Without filter	Filter ram-lak
<div><p>Laminogram</p><p>The plot shows a dark square with a single bright spot at the center. The x and y axes are labeled from 0 to 120 in increments of 20.</p></div>	<div><p>Reconstruction Image</p><p>The plot shows a dark square with a single bright spot at the center. The x-axis is labeled 'position' from 0 to 120 in increments of 20, and the y-axis is labeled from 0 to 120 in increments of 20.</p></div>

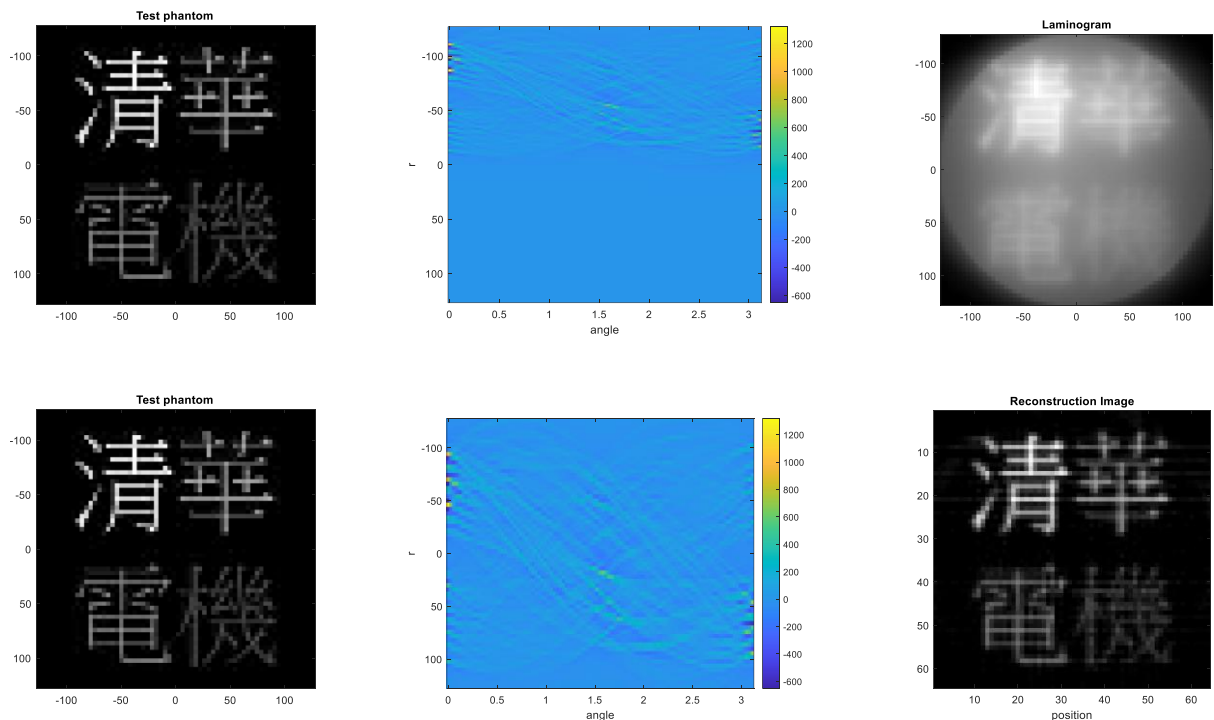
Lateral projection in dB



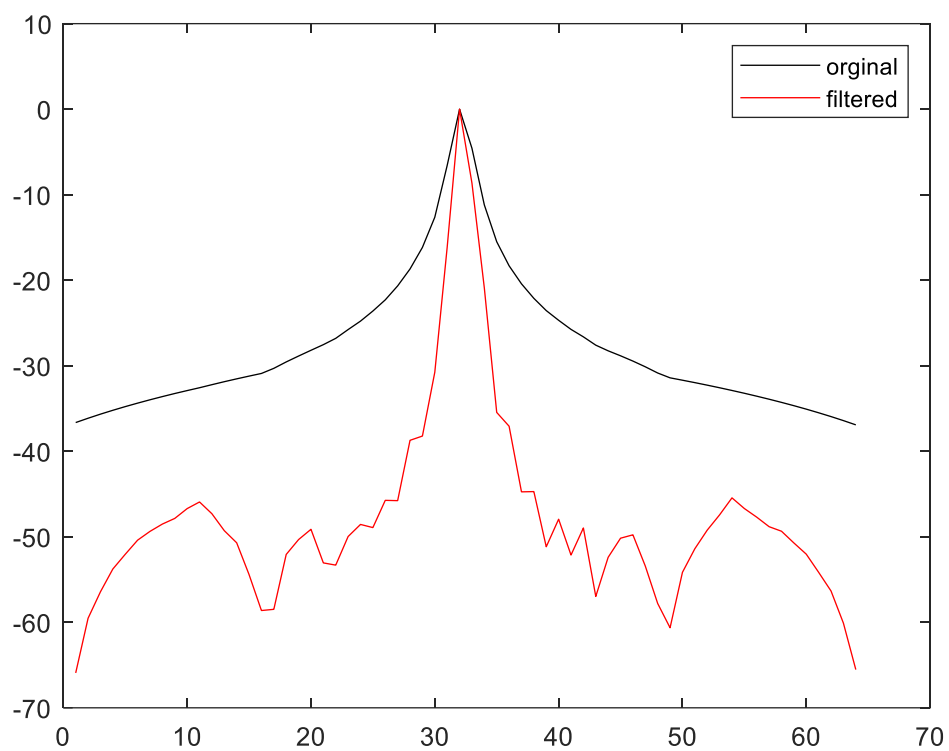
可以看到在未內插前有使用 **filter** 做處理的解析度較佳，未使用 **filter** 處理的解析度約為 2pixel，使用 **filter** 的解析度增加至 1pixel

(g)

將圖片縮為(64,64)，並且減少 number of rays/views 成 64，由於 views 和 ray 變少，會造成成像時 backprojection 數量變少使得影像變得較模糊



查看 **filter** 後的重建影像發現在背景的部分相比原本的影像具有更多雜訊，重現出來的影像由於 ray 變少造成取樣的間隔變大，解析度也變差(邊緣變得模糊)



受限於 pixel width 因此未做內插時所見到的解析度並沒有變化但 side lobe 變高，因此對比變差-> view 數量影響