dark

August 20, 2018

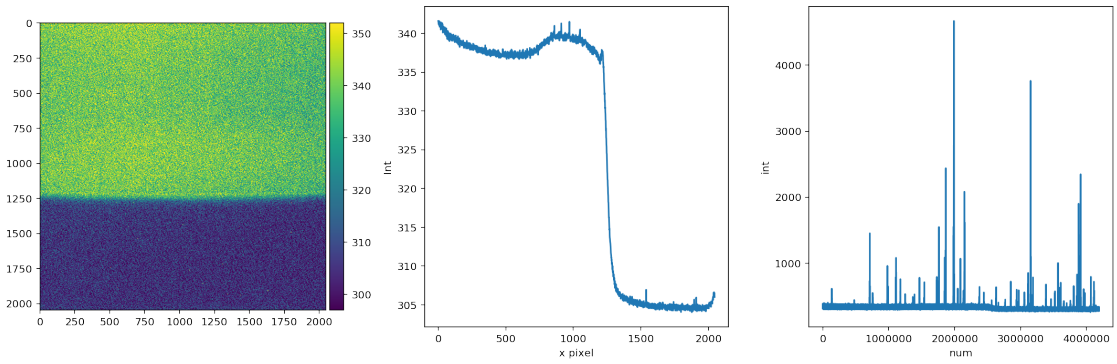
```
In [1]: from process_dark import clean_dark
        from processdata import plot_im, get_image
        import numpy as np
        import matplotlib.pyplot as plt
        from IPython import display

        %matplotlib inline
```

```
In [10]: display.set_matplotlib_formats('retina')
```

0.1 dark image

71025 300s
71026 30s
71027 60s

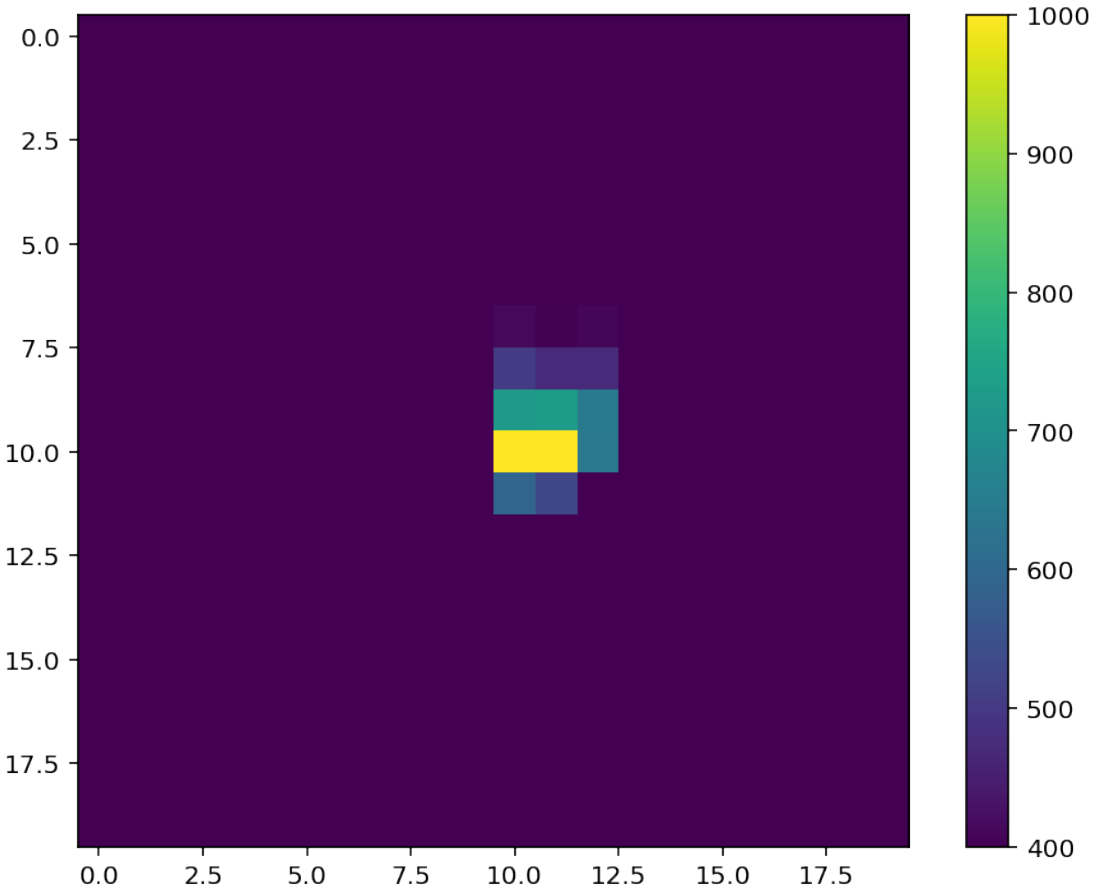
```
In [3]: image = get_image(71025)
        image = image[1:, :]

        fig, ax = plt.subplots(1,3, figsize=(15,5))
        ax1, ax2, ax3 = ax.flatten()
        _ = plot_im(ax1, image)
        _ = ax2.plot(np.sum(image, axis=1)/image.shape[1])
        _ = ax3.plot(image.ravel())
        ax2.set_xlabel('x pixel')
        ax2.set_ylabel('Int')
        ax3.set_xlabel('num')
        ax3.set_ylabel('int')
        fig.tight_layout()
```



0.2 bad points

```
In [4]: fig, ax = plt.subplots(figsize=(8,6))
        art = ax.imshow(image[850:870, 600:620], vmin=400, vmax=1000)
        plt.colorbar(art, ax=ax)
```

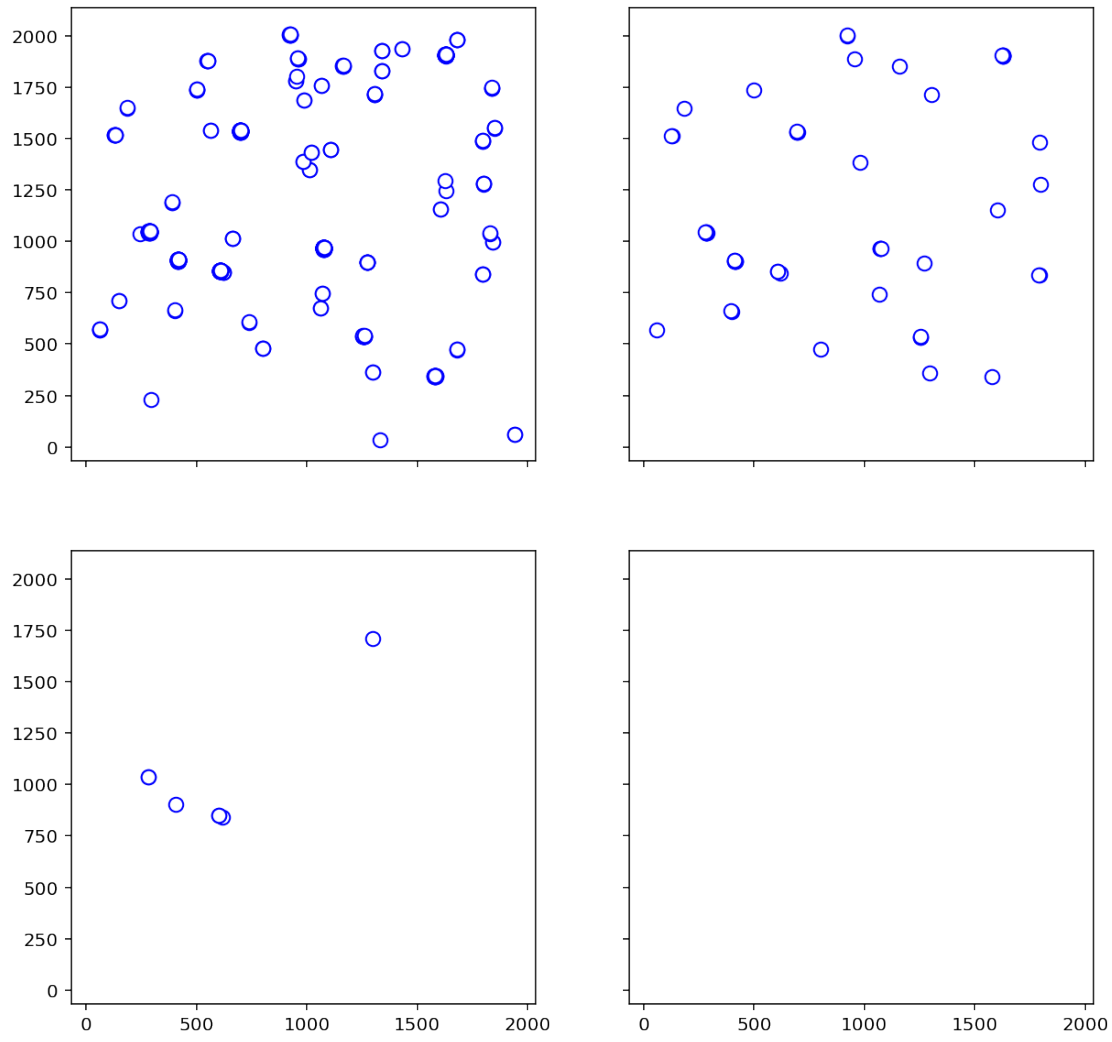
```
Out[4]: <matplotlib.colorbar.Colorbar at 0x1069f94e0>
```



1 clear dark

In [5]:
```
size=7
sp0=-5
sp1=5
w=1
deviation = 60

fig, ax = plt.subplots(2,2, figsize=(10, 10), sharex=True, sharey=True)
ax1, ax2, ax3, ax4 = ax.flatten()

image = get_image(71025)
image = image[1:, :]

im, (x, y) = clean_dark(image, size, sp0, sp1, w, deviation)
ax1.scatter(x, y, facecolor='w', s=60, edgecolors='b')
im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
ax2.scatter(x, y, facecolor='w', s=60, edgecolors='b')
im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
ax3.scatter(x, y, facecolor='w', s=60, edgecolors='b')
im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
ax4.scatter(x, y, facecolor='w', s=60, edgecolors='b')

im300 = im
```

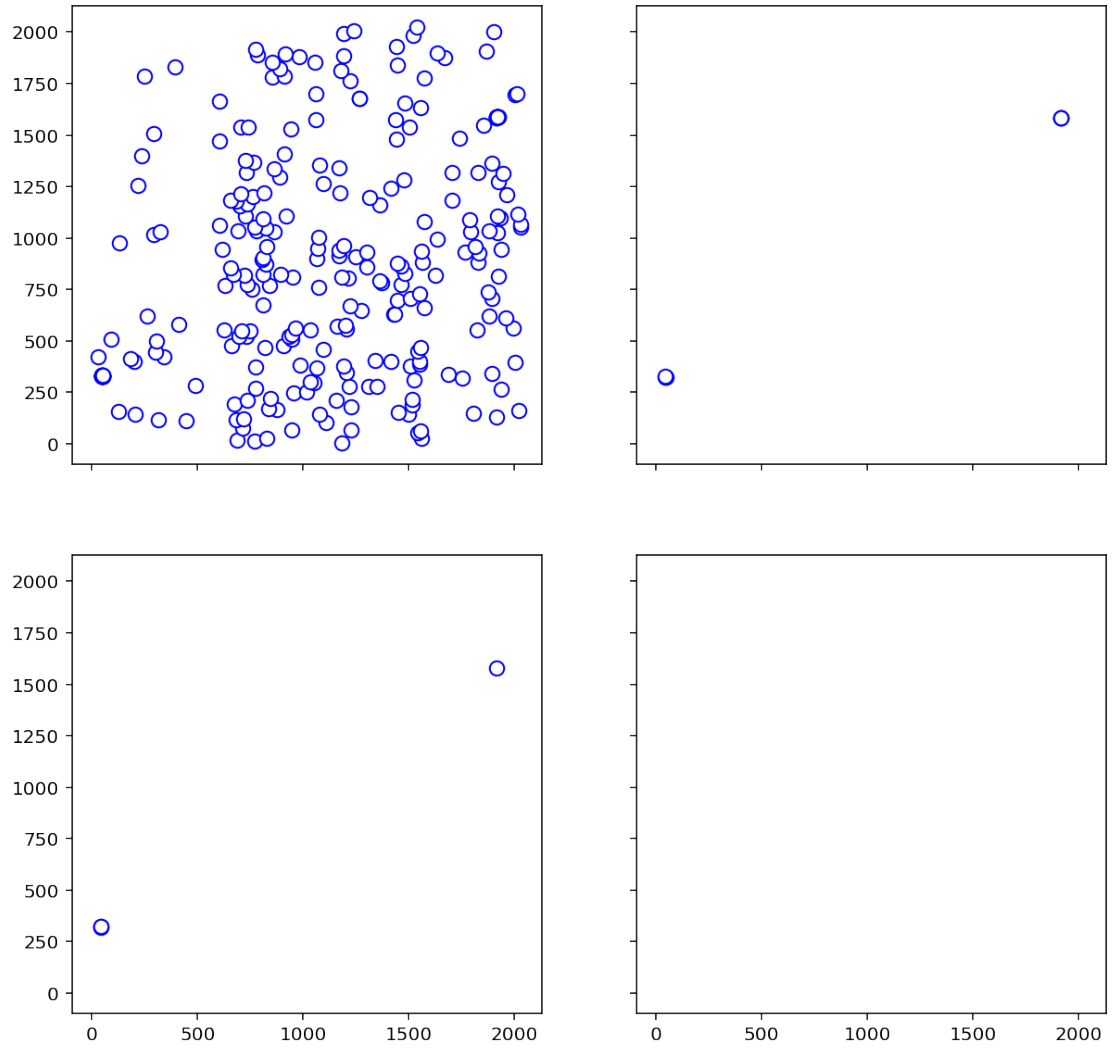
```
im.shape (2041, 2042) choose size 00441, percentile 0.010581% ,deviation 60.00
im.shape (2035, 2036) choose size 00059, percentile 0.001424% ,deviation 60.00
im.shape (2029, 2030) choose size 00007, percentile 0.000170% ,deviation 60.00
im.shape (2023, 2024) choose size 00000, percentile 0.000000% ,deviation 60.00
```



In [6]:
```
size=7
sp0=-5
sp1=5
w=1
deviation = 30

fig, ax = plt.subplots(2,2, figsize=(10, 10), sharex=True, sharey=True)
ax1, ax2, ax3, ax4 = ax.flatten()

image = get_image(71026)
image = image[1:, :]

im, (x, y) = clean_dark(image, size, sp0, sp1, w, deviation)
ax1.scatter(x, y, facecolor='w', s=60, edgecolors='b')
im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
```

```
        ax2.scatter(x, y, facecolor='w', s=60, edgecolors='b')
        im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
        ax3.scatter(x, y, facecolor='w', s=60, edgecolors='b')
        im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
        ax4.scatter(x, y, facecolor='w', s=60, edgecolors='b')

        im30 = im
```

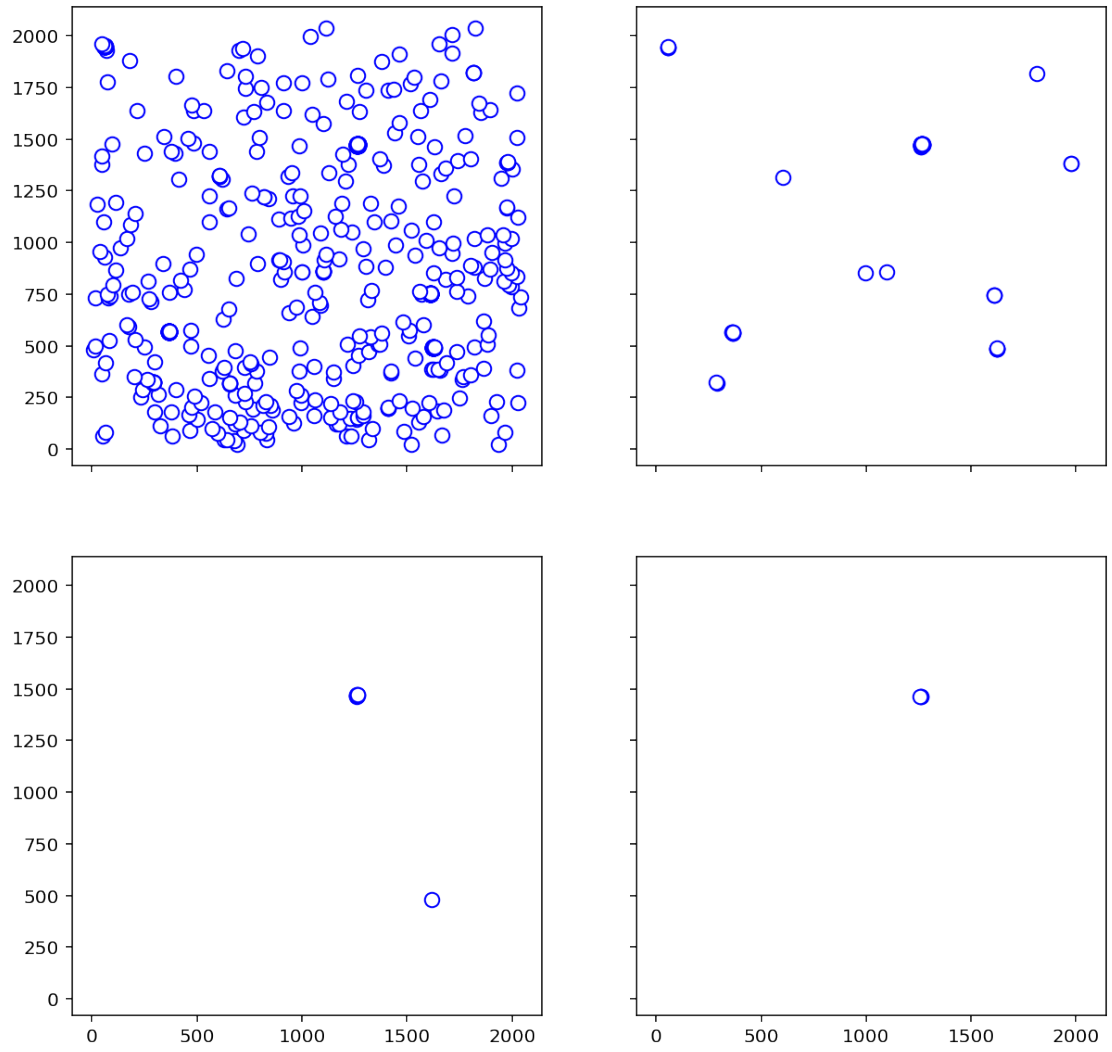
```
im.shape (2041, 2042) choose size 00276, percentile 0.006622% ,deviation 30.00
im.shape (2035, 2036) choose size 00007, percentile 0.000169% ,deviation 30.00
im.shape (2029, 2030) choose size 00004, percentile 0.000097% ,deviation 30.00
im.shape (2023, 2024) choose size 00000, percentile 0.000000% ,deviation 30.00
```



In [8]:
```
size=7
sp0=-5
```

```
        sp1=-5
        w=1
        deviation = 30

        fig, ax = plt.subplots(2,2, figsize=(10, 10), sharex=True, sharey=True)
        ax1, ax2, ax3, ax4 = ax.flatten()

        image = get_image(71027)
        image = image[1:, :]

        im, (x, y) = clean_dark(image, size, sp0, sp1, w, deviation)
        ax1.scatter(x, y, facecolor='w', s=60, edgecolors='b')
        im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
        ax2.scatter(x, y, facecolor='w', s=60, edgecolors='b')
        im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
        ax3.scatter(x, y, facecolor='w', s=60, edgecolors='b')
        im, (x, y) = clean_dark(im, size, sp0, sp1, w, deviation)
        ax4.scatter(x, y, facecolor='w', s=60, edgecolors='b')

        im60 = im
```

```
im.shape (2041, 2042) choose size 00619, percentile 0.014852% ,deviation 30.00
im.shape (2035, 2036) choose size 00068, percentile 0.001641% ,deviation 30.00
im.shape (2029, 2030) choose size 00009, percentile 0.000219% ,deviation 30.00
im.shape (2023, 2024) choose size 00003, percentile 0.000073% ,deviation 30.00
```



1.1 clear dark process 30 and 60s dark by 300s dark

In [20]:
```
fig, ax = plt.subplots(figsize=(10,6))

c = 301.6

I1 = np.sum(im300, axis=1)/im300.shape[1]
ax.plot(I1, label='300s')

I2 = np.sum(im60, axis=1)/im60.shape[1]
ax.plot(I2, label='60-1s')
ax.plot((I1-c)/5+c, label='60s')

I3 = np.sum(im30, axis=1)/im30.shape[1]
```

```
        ax.plot((I1-c)/10+c, label='30s')
        ax.legend()
```

```
FigureCanvasNbAgg()
```

Out[20]: <matplotlib.legend.Legend at 0x1a29f37e80>