```
%Assess Beacon Spot
addpath('2dgaussian301');
addpath('data');
sigma_req = 0.5*(0.95/0.963)*4.2; %uplink budget has a 96.3% airy
 radius of 4.2, or about a 2 sigma (95%) of 4.1433
filename = 'data/2020-09-12-16-22-30_ACQUISITION_exp_963.png';
imdata = imread(filename);
imdata_normalized = imdata/max(max(imdata));
figure;
imagesc(imdata_normalized);
title('Beacon Image (Normalized)');
colorbar;

sz = size(imdata_normalized);
[xi,yi] = meshgrid(1:sz(2), 1:sz(1));
zi = double(imdata_normalized);
results = autoGaussianSurf(xi,yi,zi);
disp(['file: ', filename]);
disp(results);
disp(['sigma_req = ', num2str(sigma_req)]);
if((results.sigmax <= sigma_req) && (results.sigmay <= sigma_req))
    disp('(results.sigmax <= sigma_req)) and (results.sigmax <=
 sigma_req)');
    disp('PASSED');
else
    disp('(results.sigmax > sigma_req)) or (results.sigmax >
 sigma_req)');
    disp('FAILED');
end
hold on;
gaussian_fit = @(xi,yi,results) results.a*exp(-((xi-results.x0).^2/2/
results.sigmax^2 + (yi-results.y0).^2/2/results.sigmay^2)) +
 results.b;
contour(xi,yi,results.G,gaussian_fit(results.x0 + results.sigmax,
 results.y0, results));
hold off;
```

Iteration	*Func-count*	*f(x)*	*Norm of step*	*First-order optimality*
0	*1*	*1.30274*		*73.8*
1	*2*	*1.0863*	*0.360091*	*75.3*
2	*3*	*1.0863*	*0.613583*	*75.3*
3	*4*	*0.930949*	*0.153396*	*30.5*
4	*5*	*0.930949*	*0.153396*	*30.5*
5	*6*	*0.904137*	*0.0383489*	*15*
6	*7*	*0.891275*	*0.0383489*	*3.18*
7	*8*	*0.891275*	*0.0383489*	*3.18*
8	*9*	*0.891275*	*0.00958723*	*3.18*
9	*10*	*0.891273*	*0.00239681*	*3.34*
10	*11*	*0.891237*	*0.000599202*	*3.28*
11	*12*	*0.891208*	*0.000149801*	*3.21*

12	13	0.891196	3.74501e-05	3.18
13	14	0.891184	3.74501e-05	3.15
14	15	0.891173	3.74501e-05	3.13
15	16	0.891162	3.74501e-05	3.1
16	17	0.891151	3.74501e-05	3.07
17	18	0.891148	9.36253e-06	3.06
18	19	0.891145	9.36253e-06	3.05
19	20	0.891142	9.36253e-06	3.04
20	21	0.891139	9.36253e-06	3.03
21	22	0.891136	9.36253e-06	3.03
22	23	0.891133	9.36253e-06	3.02
23	24	0.89113	9.36253e-06	3.01
24	25	0.891127	9.36253e-06	3
25	26	0.891124	9.36253e-06	2.99
26	27	0.891121	9.36253e-06	2.99
27	28	0.891118	9.36253e-06	2.98
28	29	0.891115	9.36253e-06	2.97
29	30	0.891112	9.36253e-06	2.96
30	31	0.891109	9.36253e-06	2.95
31	32	0.891106	9.36253e-06	2.95
32	33	0.891104	9.36253e-06	2.94
33	34	0.891101	9.36253e-06	2.93
34	35	0.891098	9.36253e-06	2.92
35	36	0.891095	9.36253e-06	2.91
36	37	0.891094	2.34063e-06	2.91
37	38	0.891094	2.34063e-06	2.91
38	39	0.891093	2.34063e-06	2.91
39	40	0.891092	2.34063e-06	2.9
40	41	0.891091	2.34063e-06	2.9
41	42	0.891091	2.34063e-06	2.9
42	43	0.89109	2.34063e-06	2.9
43	44	0.891089	2.34063e-06	2.9
44	45	0.891089	2.34063e-06	2.89
45	46	0.891088	2.34063e-06	2.89
46	47	0.891087	2.34063e-06	2.89
47	48	0.891086	2.34063e-06	2.89
48	49	0.891086	2.34063e-06	2.89
49	50	0.891085	2.34063e-06	2.88
50	51	0.891084	2.34063e-06	2.88
51	52	0.891084	2.34063e-06	2.88
52	53	0.891083	5.85158e-07	2.88

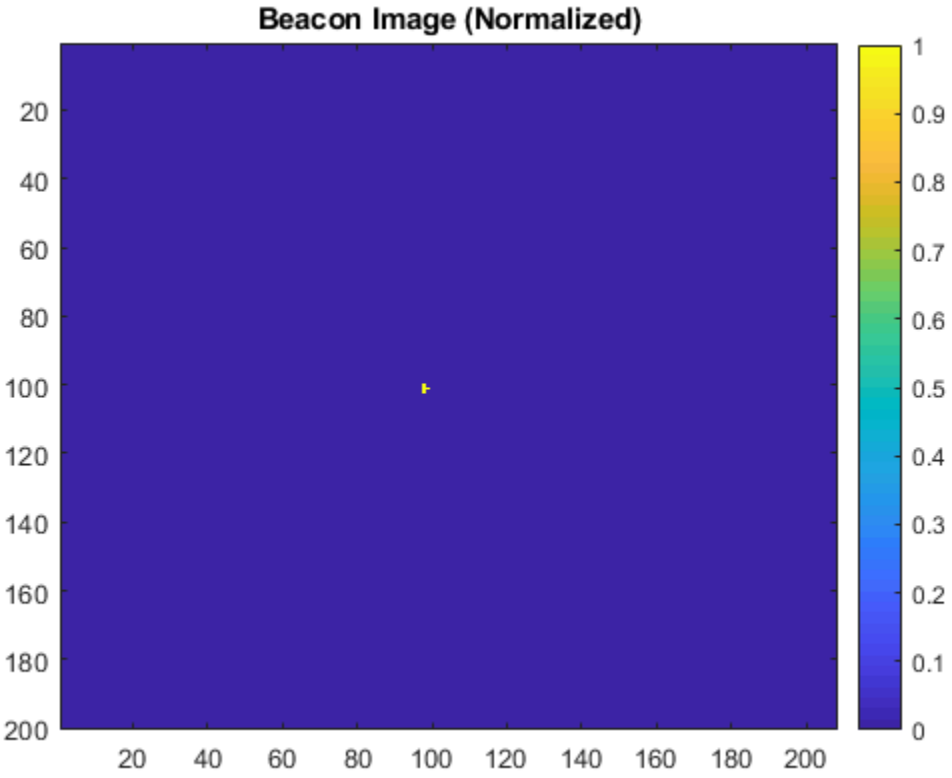
Local minimum possible.

lsqcurvefit stopped because the size of the current step is less than the default value of the step size tolerance.

```
file: data/2020-09-12-16-22-30_ACQUISITION_exp_963.png
         a: 1.4340
         b: 0.0011
        x0: 98.2181
        y0: 101.0000
```

```
    sigmax: 0.6289
    sigmay: 1.0546
         G: [200×208 double]
       sse: 0.9039
      sse0: 3.9996
        r2: 0.7740

sigma_req = 2.0717
(results.sigmax <= sigma_req)) and (results.sigmax <= sigma_req)
PASSED
```



Published with MATLAB® R2018b