

Countour 2D plot of experimental data set

There is set of experimental data files:

- S-curve168.txt
- ...
- S-curve468.txt.

Each file corresponds to the specific magnetic field applied during the measurement (fields set: 7 - 10 mT, step 0.01 mT).

File contains 2 columns: changing parameter (level) and response of the sample (critical current).

2D map: X: level, Y: magnetic field, Z: current

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In [14]: # %matplotlib qt
         %matplotlib inline
```

```
In [15]: import numpy as np
         import matplotlib.pyplot as plt
```

```
In [16]: # generate filenames
         files = np.arange(168,468,1)
         len(files)
```

Out[16]: 300

```
In [17]: levels = []
         currents = []

         for file in files:

             path='S-curves/S-curve'+str(file)+'.txt'

             with open(path, 'r') as f:
                 rawdata = np.array([float(i) for i in f.read().split()], dtype=np.float64)
                 levels.append(rawdata[0::2])
                 currents.append(rawdata[1::2])

         levels_np = np.array(levels)
         currents_np = np.array(currents)*15 # 15 - conversion factor. I(uA) = rawdata(V) * 15
         (uA/V)
```

```
In [18]: currents_np.shape
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Out[18]: (300, 101)

```
In [19]: #fields set
         fields = np.linspace(7,10,300)
```

```
In [20]: #Building 2D array of fields for plot
         fields2D = []
         for i in range(101):
             fields2D.append(fields)
         fields2D = np.transpose(fields2D)
```

```
In [21]: fields2D.shape
```

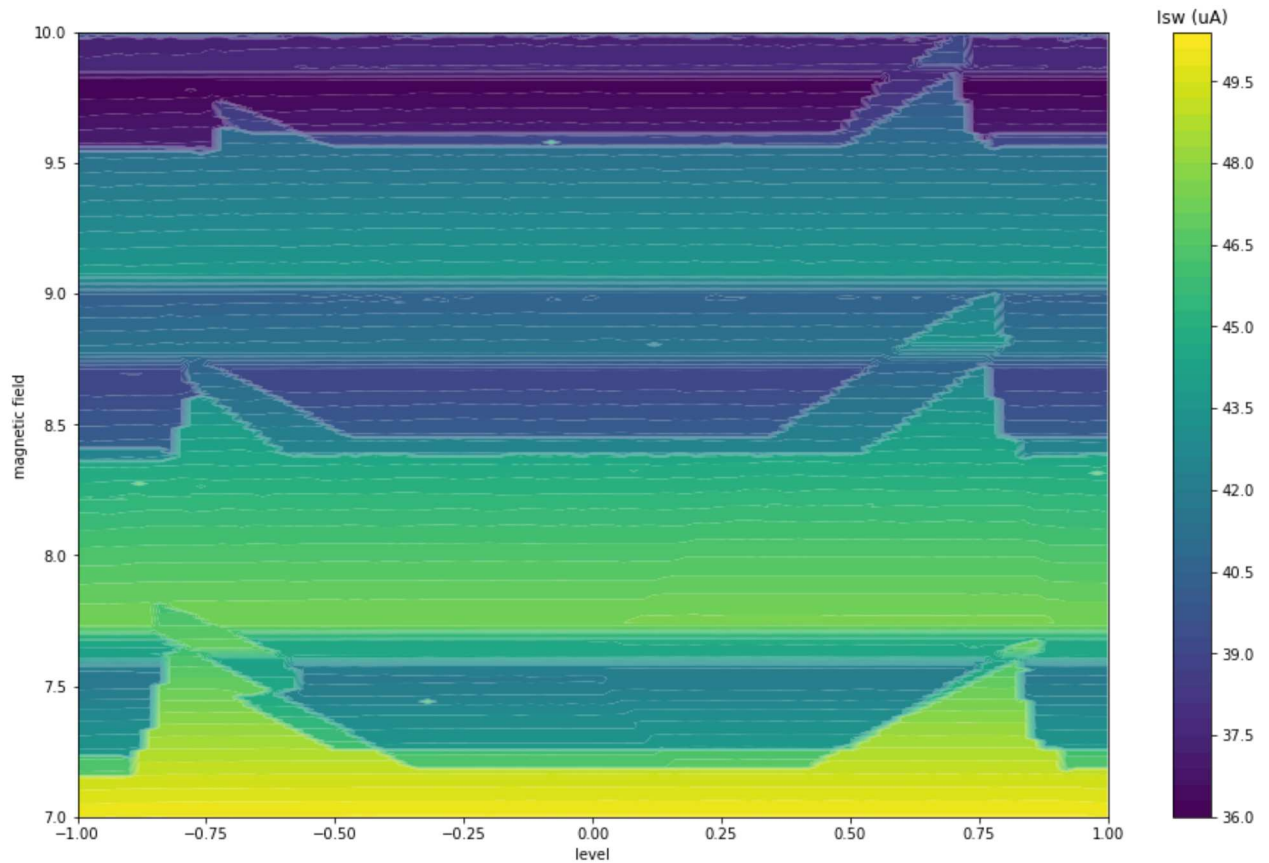
Out[21]: (300, 101)

```

In [22]: plt.figure(0)
pic1 = plt.contourf(levels_np, fields2D, currents_np, 50, cmap = 'viridis', antialiased=True)
plt.xlabel('level')
plt.ylabel('magnetic field')
figsize = (40/2.54,25/2.54) # in inches
plt.suptitle('Switching current vs magnetic field and level', fontsize=18)
plt.colorbar().ax.set_title('Isw (uA)')
plt.figure(0).set_size_inches(figsize)
plt.show()

```

Switching current vs magnetic field and level



In []: