MATBG Landau level tomography

This application provides interactive tomographic visualization of the structure of the Landau levels in magic angle twisted bilayer graphene devices. It provides a GUI for viewing the three-dimensional set of data that is acquired by successive spatial scans at different backgate voltages, and allows slicing the data along different planes.

Installation instructions

The application can be executed by either downloading the compiled executable, or by downloading the source code.

1. Using the compiled executable. This requires the freely downloadable Matlab runtime, version R2017b (9.3). It does not require a full installation of Matlab.

    a. Download and install the Matlab runtime version R2017b (9.3) from the website: *https://www.mathworks.com/products/compiler/matlab-runtime.html*

    b. Download the executable and run the file *MATBL Tomography.exe*.

2. Using the source code

    a. If Matlab verison 2017b or greater is installed, the Matlab scripts used for creating the application can be downloaded and executed using Matlab

Instructions for use

The data are shown on a 3D coordinate system with two spatial axes (x and y) and the vertical axis for the backgate voltage (V_{bg}). The three sliders define three mutually perpendicular planes. In the figure below, the three planes are defined by $x = 2.186$ µm, $y = 2.807$ µm, and $V_{bg} = -8.98$ V. These planes divide the parameter space into eight octants, out of which one octant is displayed. The controls labelled "$-x$ octant", "$-y$ octant", and "$-V_{bg}$ octant" change the octant in which data is displayed. Viewing from different perspectives is possible by using the controls labeled "Reverse axis".
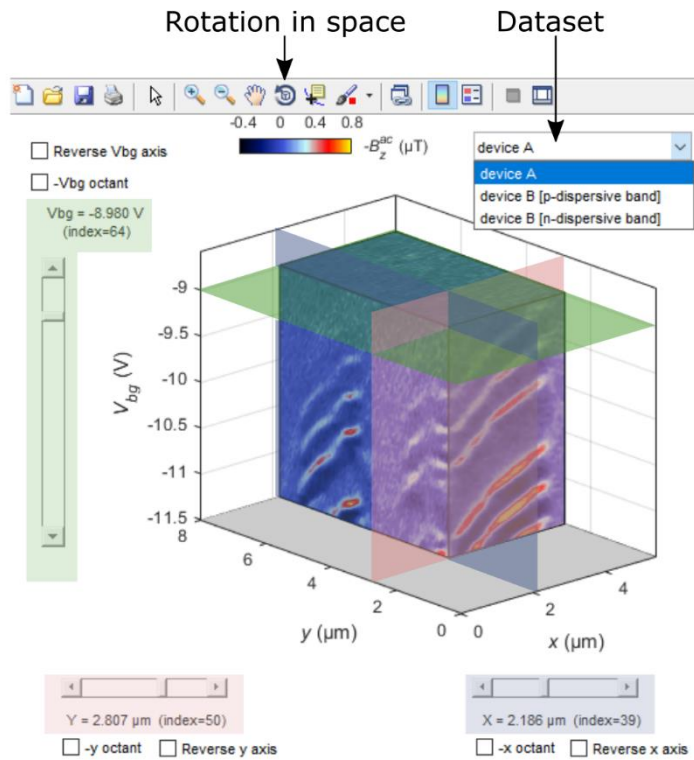
It is possible to switch between the different available sets of data using the top-right button. Three datasets are included – one for device *A*, and two for device *B*, corresponding to *n* and *p* dispersive bands. A representative image of device *B* dataset is shown below. The dataset has been truncated to remove the data outside the boundary of the device (Hall bar shape shown in gray at the bottom plane).