

SPLIT

An Interactive Visualization Tool for Showing Quantum Data

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1 Compiling

Assuming you are in \$HOME/SPLIT_VIS2

Type the following command from the terminal.

```
> VTK_DIR=<your_location_to_VTK> cmake -H. -Bbuild
> cd build
> make
> make install
> cd ..
> set OMP_NUM_THREADS=<number_of_threads_to_use>
> export OMP_NUM_THREADS=<number_of_threads_to_use>
```

2 Starting the program

If you'd like to use our default settings, please type “./run” in the terminal assuming you are in \$HOME/SPLIT_VIS2 directory. Please note that you might need to modify \$HOME/SPLIT_VIS2 SplitTool/config to make sure the data directory is correct.

Otherwise, you need to execute the program by

```
LD_LIBRARY_PATH=<your_location_to_VTK> ./bin/splitToolkit <CONFIG_FILE>
```

3 Data format and Preprocessing

3.1 Data format

Two types of data formats are supported in the program:

Type 1:

```
#line 1: position_x position_y position_z value value direction_x direction_y direction_z
magnitude
...
```

Type 2:

```
#line 1: position_x position_y position_z value value direction_x direction_y direction_z
...
```

3.2 Input Script

The default config file is \$HOME/SPLIT_VIS2/SplitTool/config

```
#datadir:
```

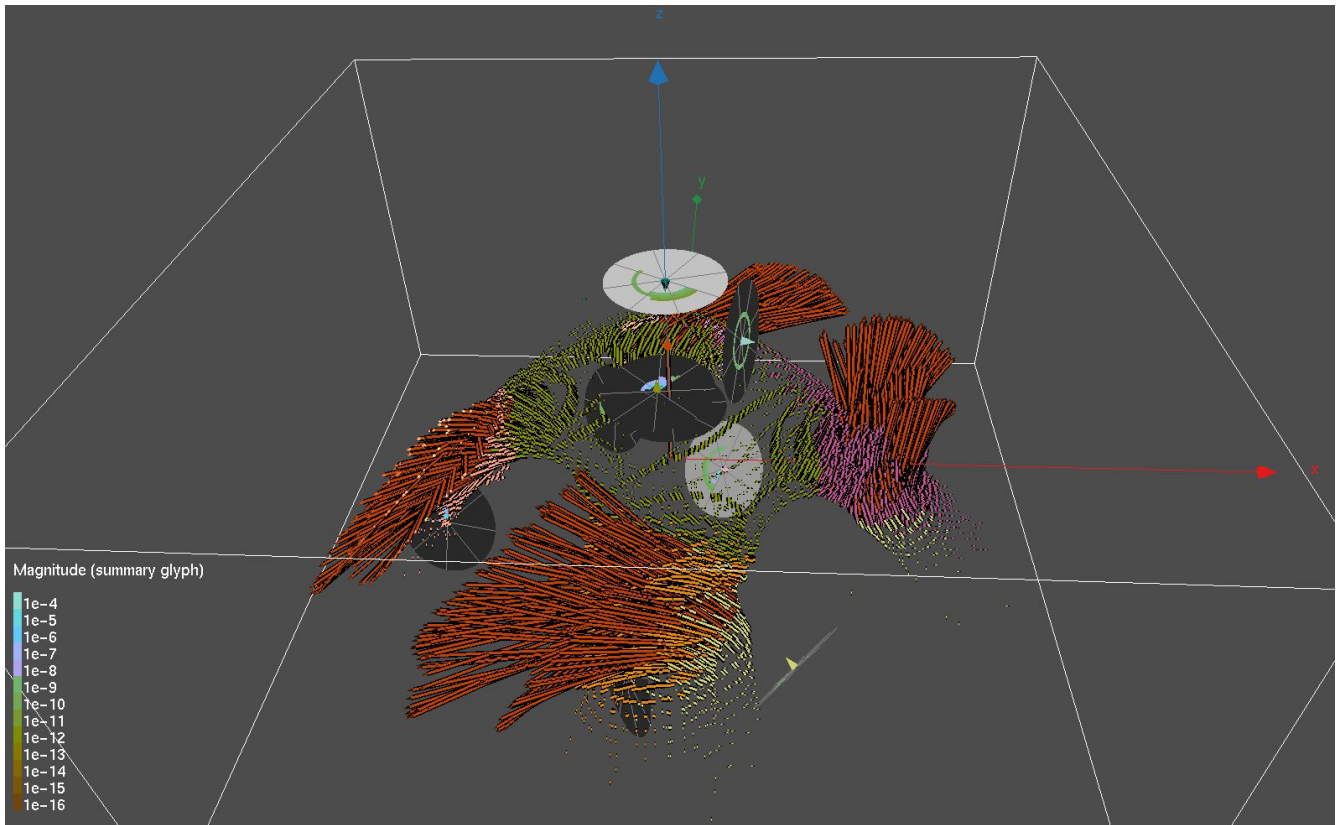
```

    <Your directory of data>
#dataname:
    <The name of your data>
#folderToStoreFiles:
    <The name of a folder to store temporary files>
#planeCenter <position_x position_y position_z>
#planeDirection <direction_x direction_y direction_z>
#planeDistance <distance of two adjacent layers>
#ifcontour:
    <0 or 1. 1: contour data. 0: original data>
#contours:
    <The number N of contours>
    <line1: G AorR value. Here A means absolute value and R means ratio value.>
    ...
    <line N:....>
#clusters:
#step1:
#weights:
#layer: <start_layer, end_layer. For example, if there are 109 layers, the two numbers
are 0 and 108>
#bywhole: <1 or 0. 1 means clustering all selected layers together. 0 means clustering
each selected layer individually>
#magrange: <min_mag max_mag>
#numofclusters:
#step2:
#weights: <Seven weight values>
#layer: <start_layer, end_layer. For example, if there are 109 layers, the two numbers
are 0 and 108>
#bywhole: <1 or 0. 1 means clustering all selected layers together. 0 means clustering
each selected layer individually>
#magrange: <min_mag max_mag>
#numofclusters:

```

4. Operations

4.1. Load the SPLIT tool



The colors of arrows represent clusters, and the colors on the discs of summary glyphs represent magnitude (please refer to the legend).

Zoom in/out: holding the right button

Pan: holding the left button and "shift" button

Rotate: holding the left button

Home button: "h" or "H" button

4.0 Load a new data

Step 1: Replace *#datadir* and *#dataname* using your directory and data name in the input script.

Step 2: Press "u" button.

4.1 Define layers (cutting plane)

Step 1: Replace *#planeCenter*, *#planeDirection*, *#planeDistance* using the information of expect layers in the input script.

Step 2: Delete the folder which stores temporary file. For example, if the data name is "z_10z" data and the given name of *#folderToStoreFiles* in your input script is "tmp", please delete \$HOME/SPLIT_VIS2/tmp/z_10z folder.

Step 3: Press “u” button.

Please note that the current program only supports one type of layer for each data. So if you want to load the same data multiple times with different types of planes, please delete the folder which stores temporary file before starting the program.

4.2 Clustering

The program supports two-step clustering.

Please do as the following instructions to achieve the first step clustering (*#step1* in the input script).

Step 1: Define weights. Modify *#weight* in your script file. The seven numbers are weights of position_x, position_y, position_z, direction_x, direction_y, direction_z and magnitude.

Step 2: Define regions. Modify *#layer* by giving two numbers: the minimum index of select layers and the maximum index. For example, if there are 109 layers and you expect to see all layers, the two numbers are 0 and 108.

Step 3: Modify *#bywhole* in your script file.

Step 4: Modify *#magrange* by giving two numbers: the minimum magnitude and maximum magnitude.

Step 5: Define # of clusters by modifying *#numofclusters*.

If you want to have the second step clustering, please do the step1-step5 operations for *#step2*. Otherwise, please give some invalid information in *#step2*. For example, one option is

#step2:

...

#layer: 0 -1

...

Step 6: Press “u” button.

4.3 Contours

Step 1: Define the number of contours in *#contours* in your input script.

Step 2: Define contour values.

Here is an example

#contours:

2

G A 1e-6

G R 0.5

//Generate contours on each layer with the value as 1e-6

//Generate contours on each layer with the value 0.5 x the maximum magnitude on the layer

Step 3: Press “u” button

To toggle between multiple contours, please press “c” button. The information of current

contours will be displayed in the terminal.

4.4 Summary glyph

To enable/disable the summary glyphs, please press “s” button.

4.5 Visibility

Please press “I” or “L” button to define the visible regions, and input the indexes of layers in the terminal

Here is an example of information displayed in the terminal after “I” or “L” button has been pressed.

Please input the index of the min layer

...

Please input the index of the max layer

...

To toggle each individual layers or multiple layers,

Step 1: Please press “I” or “L” button to define the visible regions, and input the indexes of layers in the terminal.

Step 2: Press “t” to decrease the indexes of all selected layers (shift all selected layers), or press “T” to increase the indexes of all selected layers.

For example, if the indexes of the selected layers are from 50 to 60, then the new indexes of displayed layers will be 51 to 61 when pressing “T” button.

The locations of displayed layers will be shown in terminal.

4.6 Adjust scaling

To increase the length of arrows and lines, please press “x”; to decrease the length of arrows and lines, please press “X”. Each time the length will increase or decrease by 1.5 times.

4.7 Region

To display the 3D boundary of one region, please press “m” button.

For example, there are two regions defined in spin_proj_norm_vs_pos_p_v_z_10z, so you can see the surface of two regions by pressing “m” button. Each time only one region is displayed.

