

ScatterX user guide

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Environment

- Windows10、 11
- MATLAB 2022B and later
- Recommend: 8-core CPU, 16GB RAM

Functions

- **2D image processing**

1. Auto find beamcenter
2. Cake integration

- **Background subtraction**

- **absolute intensity calibration**

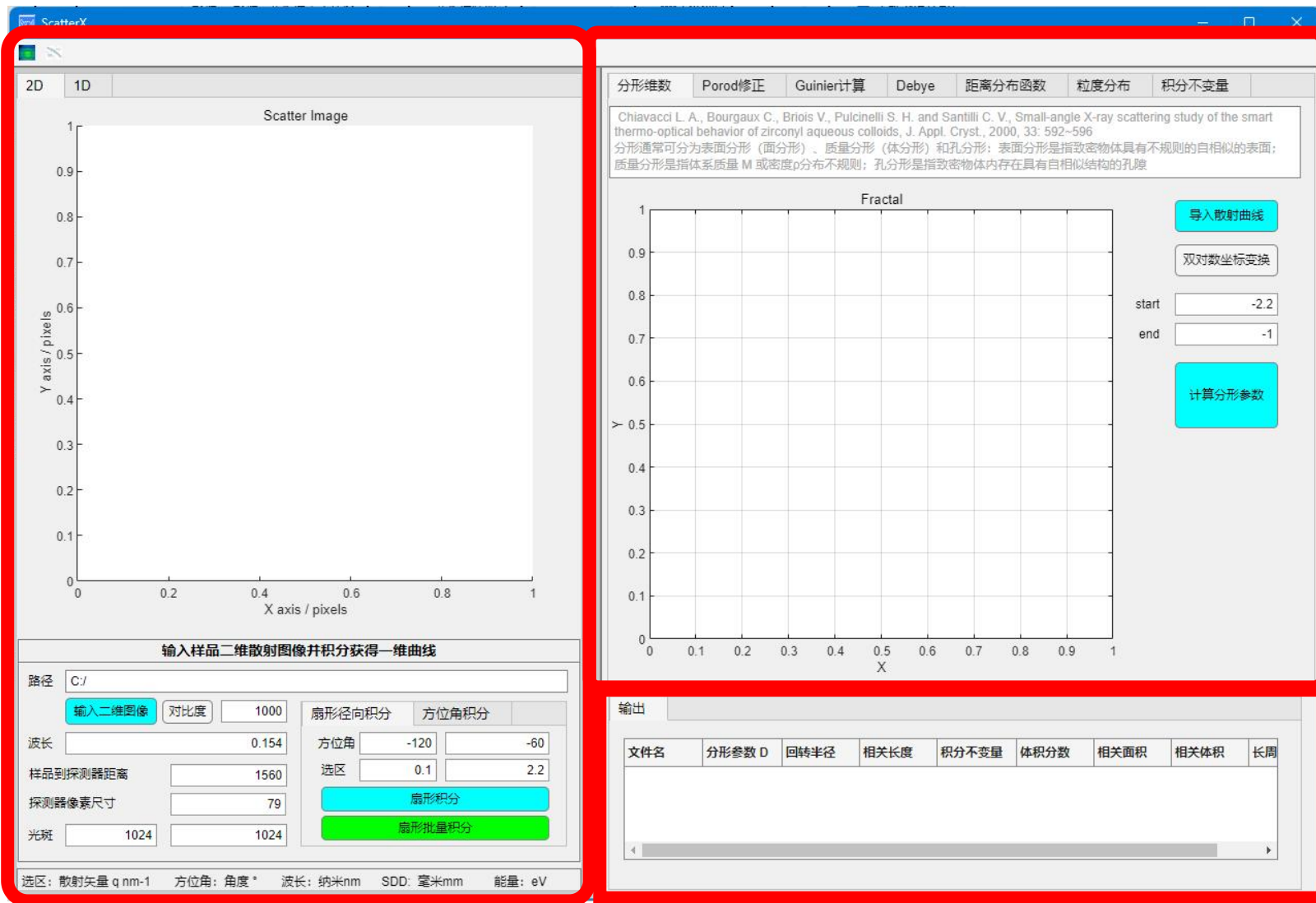
- **Calculate the fractal dimension**

- **Porod calibration, Guinier**

- **Calculate the Correlation function**

- **Calculate the PDDF**

- **Calculate the PSD**



The software interface is divided into three modules:

- 1、Data preprocessing
- 2、Data analysis
- 3、Data output

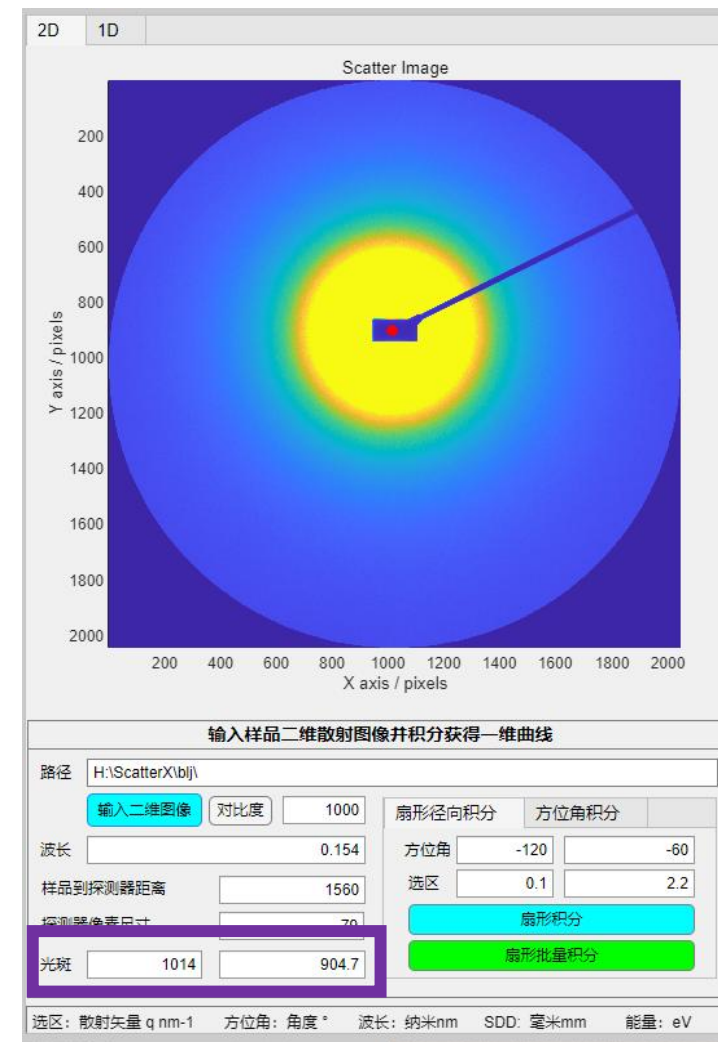
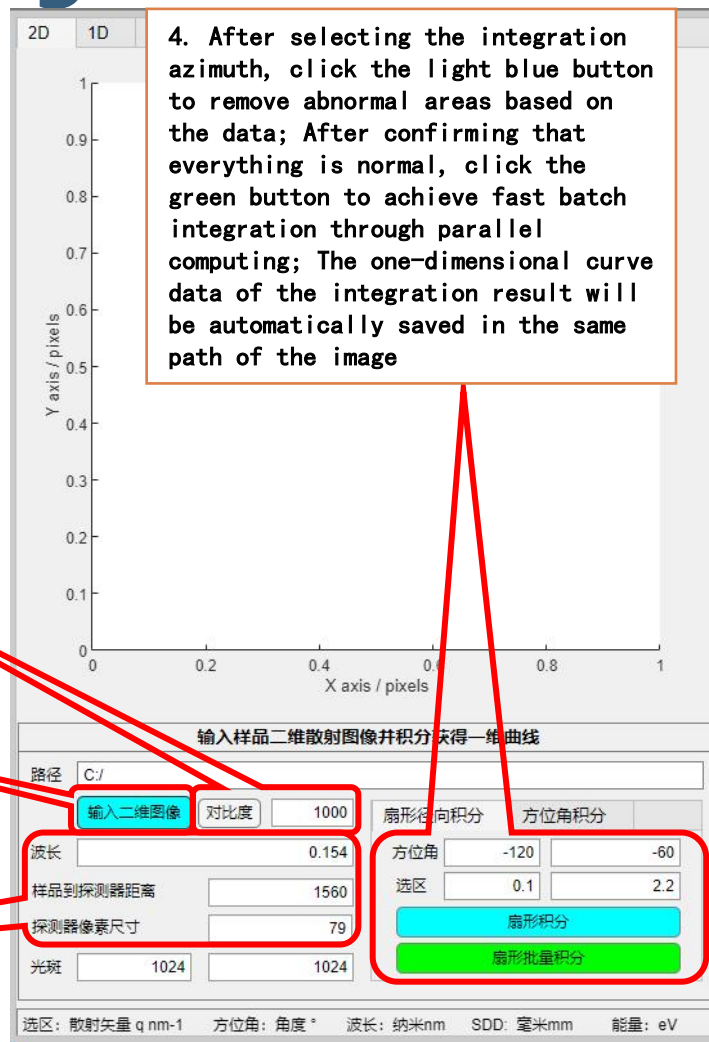
1、 Data preprocessing

1. Open the pop-up and click on the 2D scattering image. While displaying the image, the center of the light spot will be automatically calculated and displayed in the software.

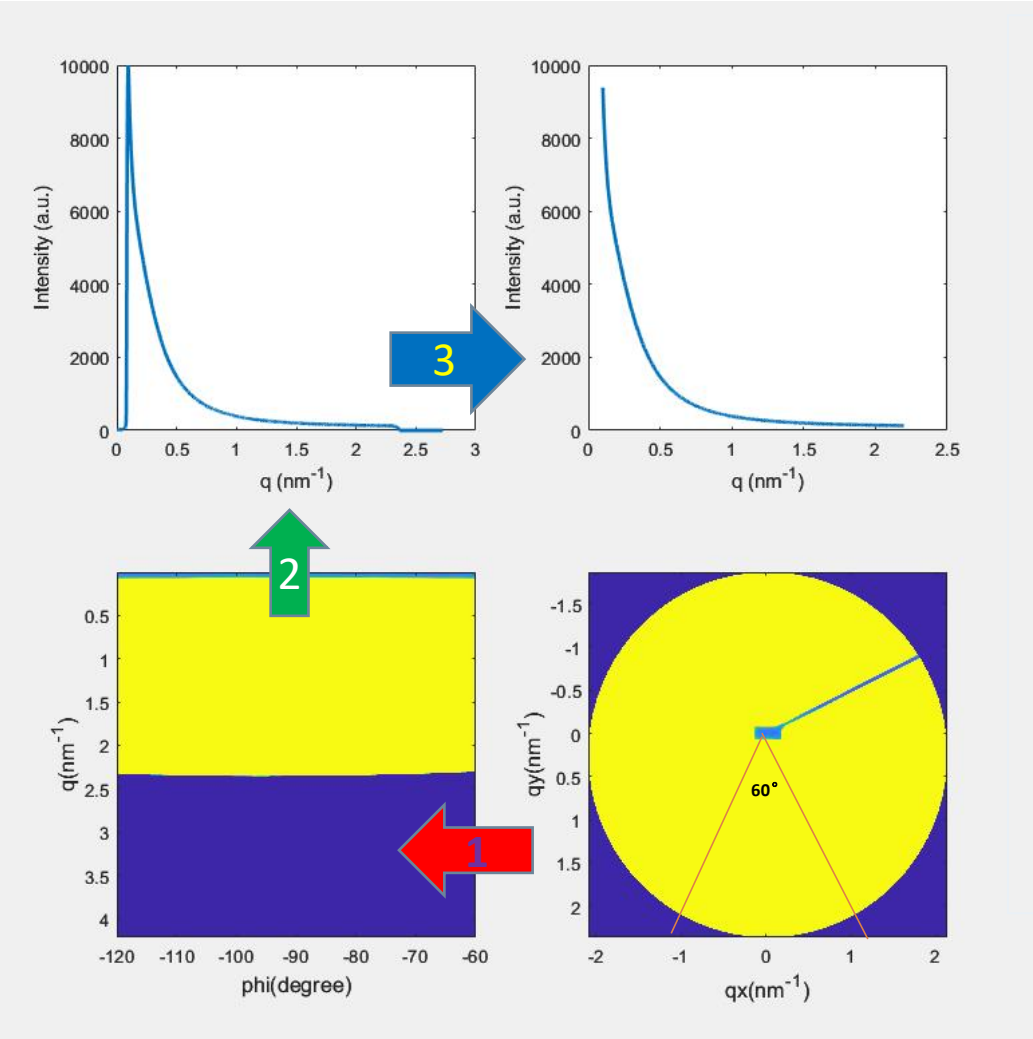
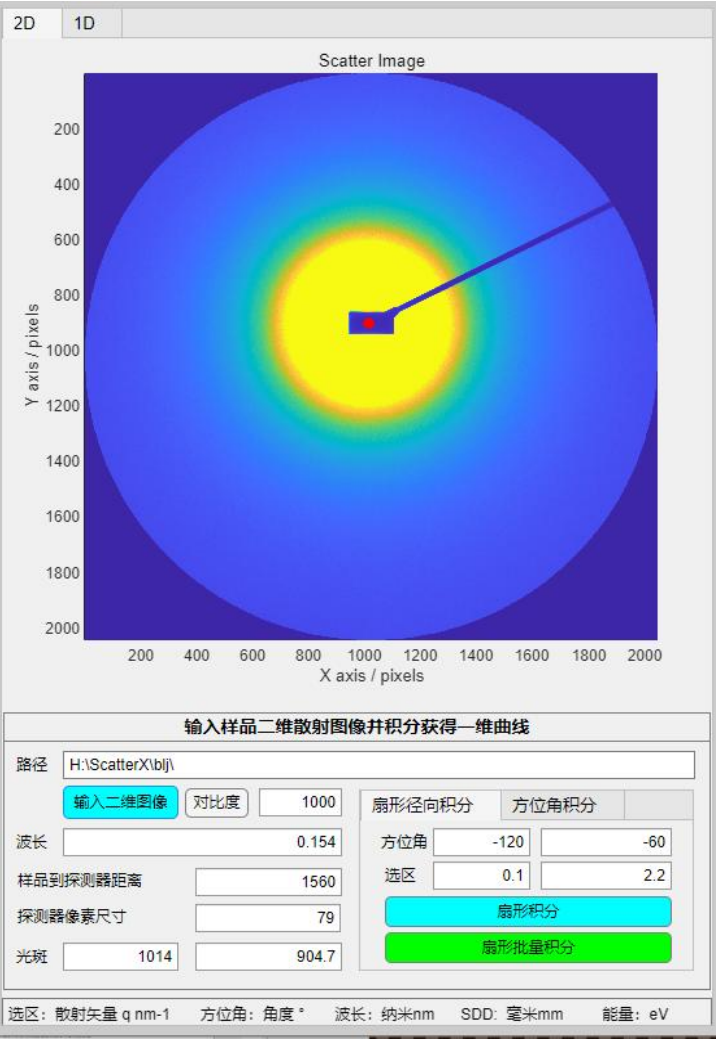
3. Input the actual parameters during the operation of the experimental station

2. When the display of two-dimensional scattering images is not good, the image contrast can be adjusted

4. After selecting the integration azimuth, click the light blue button to remove abnormal areas based on the data; After confirming that everything is normal, click the green button to achieve fast batch integration through parallel computing; The one-dimensional curve data of the integration result will be automatically saved in the same path of the image

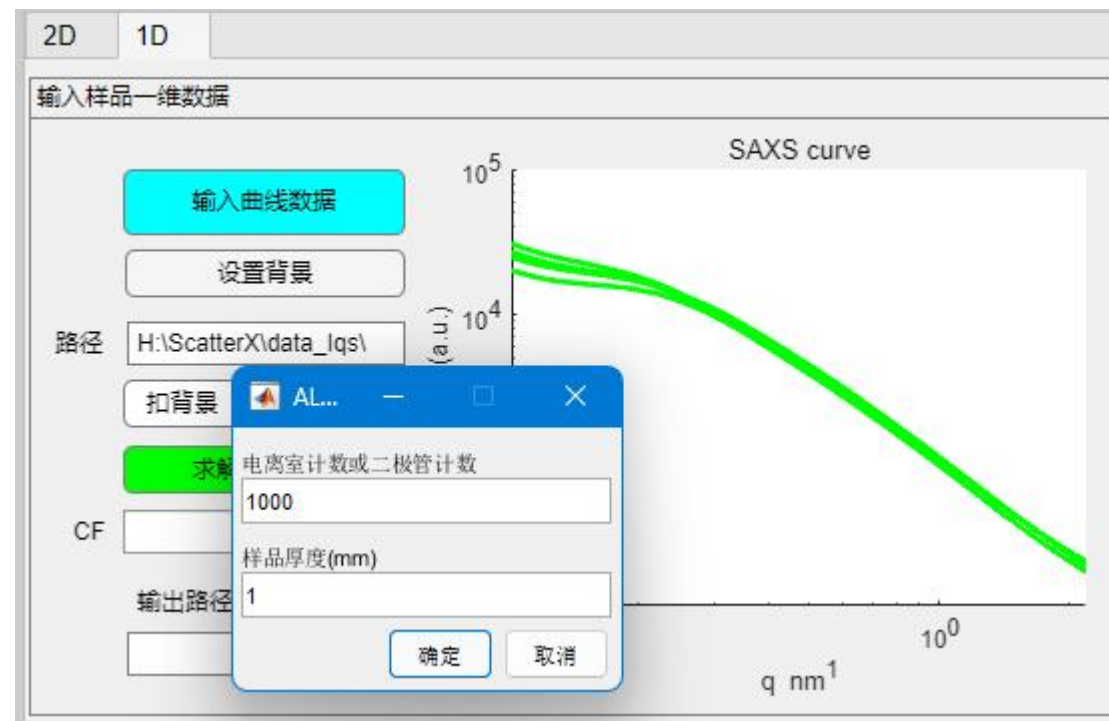
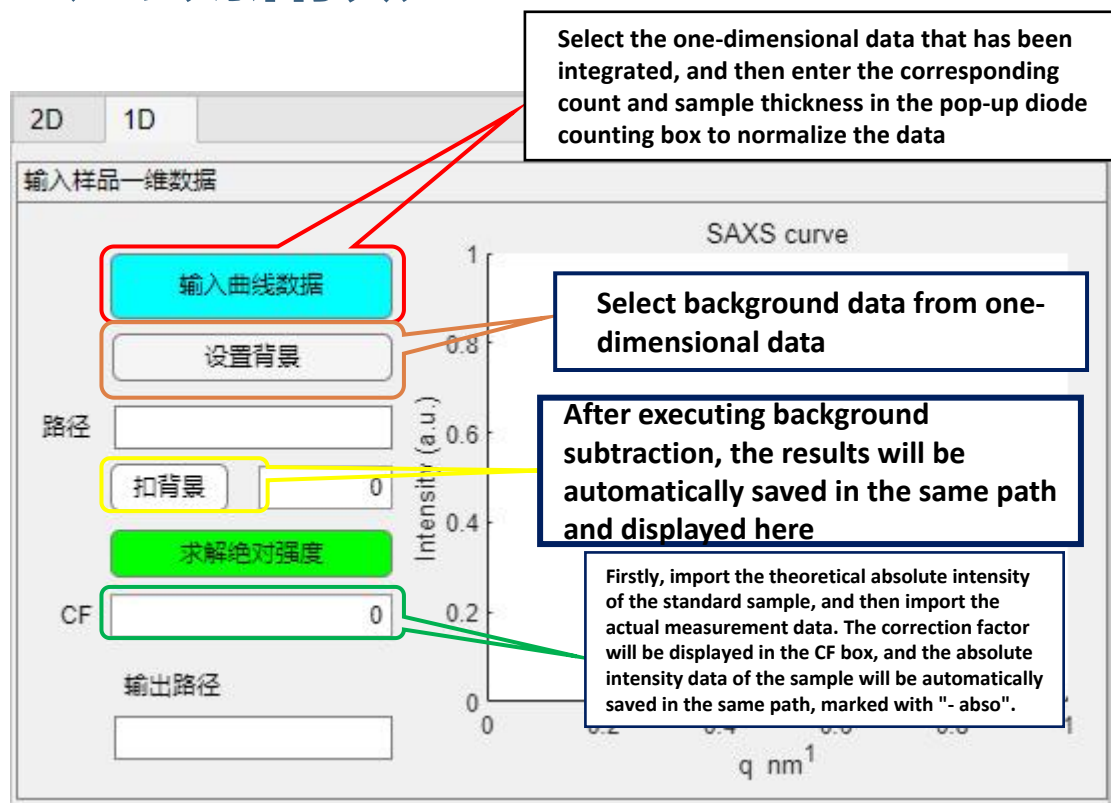


1.1、数据预处理



- Logic:
1. Extract the intensity values from the two-dimensional image radially outward from the center of the light spot.
 2. Average the values taken from each angle to obtain a one-dimensional scattering curve, and transform the horizontal axis from Radial to q -space during the process.
 3. Exclude abnormal values from the Beamstop region and outside the detection area at the minimum q .

1.2、数据预处理

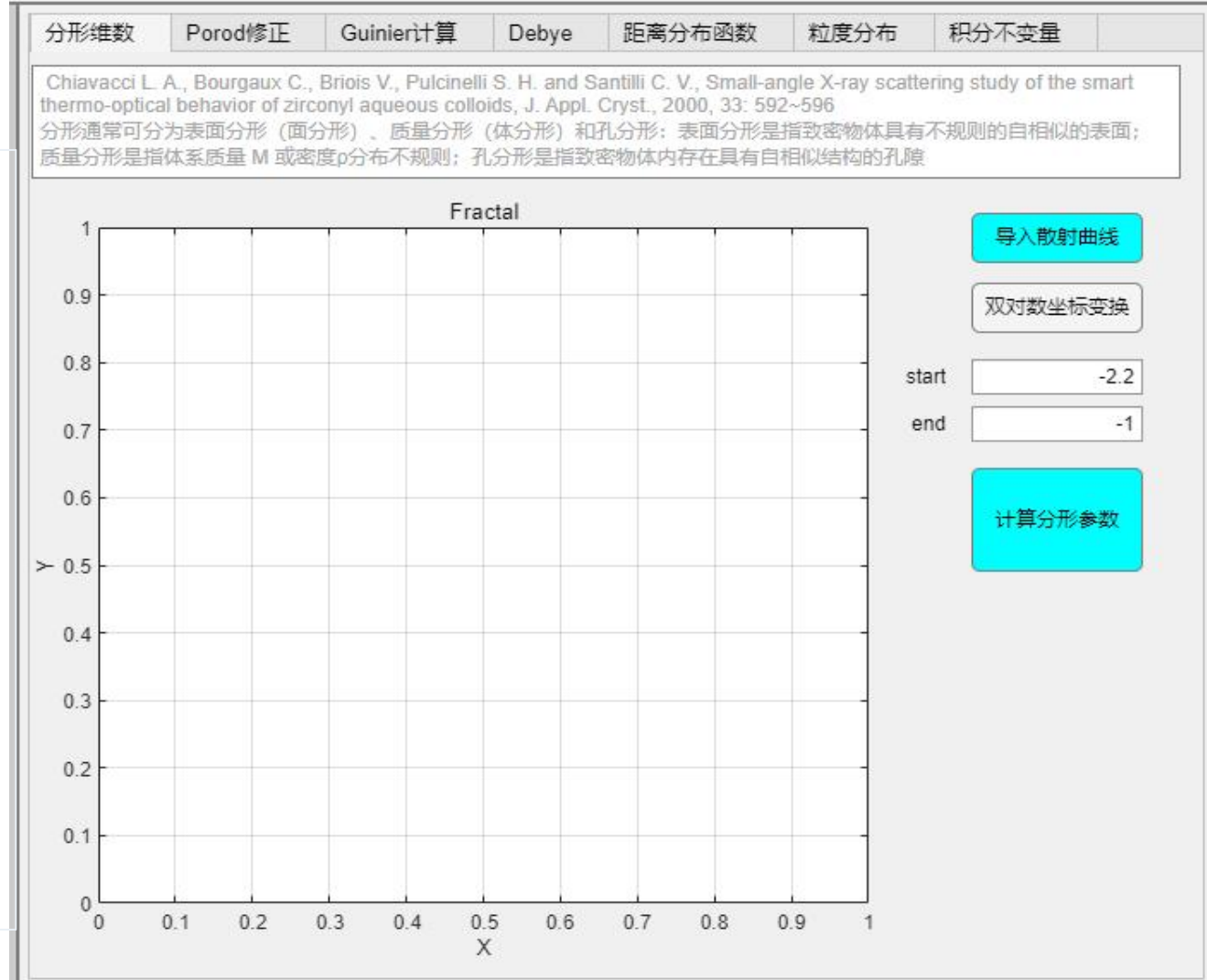


When subtracting the scattering background, the ionization chamber count after passing through the sample and the thickness of the sample are usually used

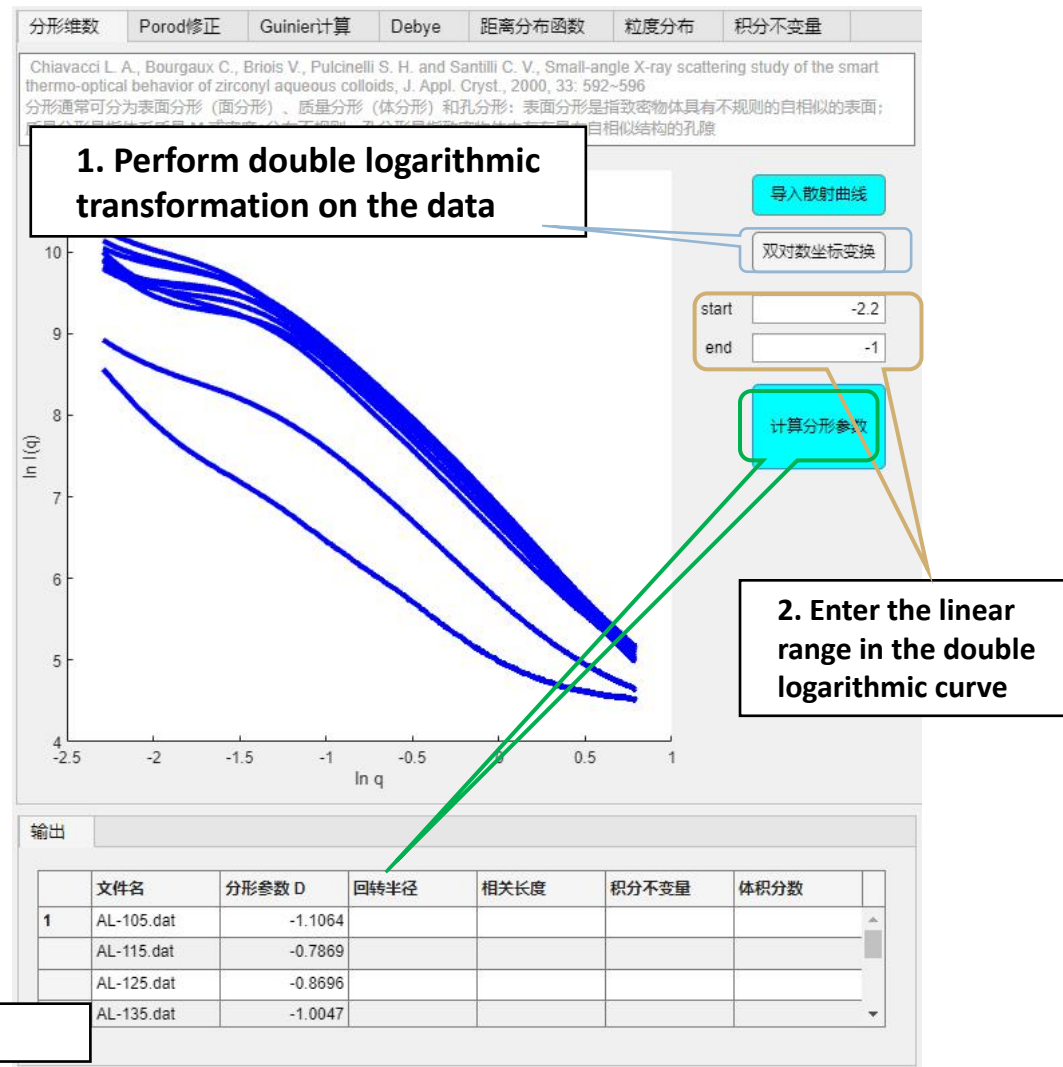
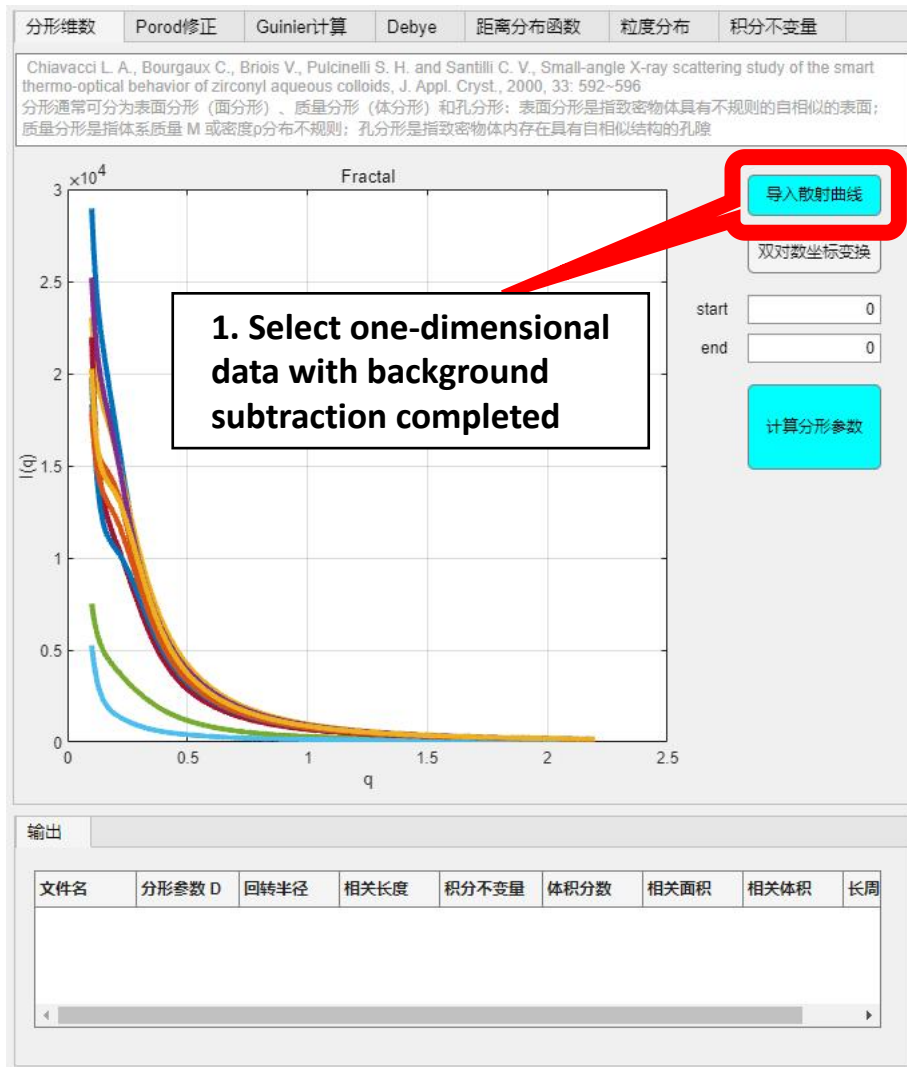
2、 Data analysis

Data Analysis:

1. Fractal dimension
2. Porod correction
3. Guinier calculation
4. One-dimensional electron density correlation function
5. Distance distribution function
6. Particle size distribution

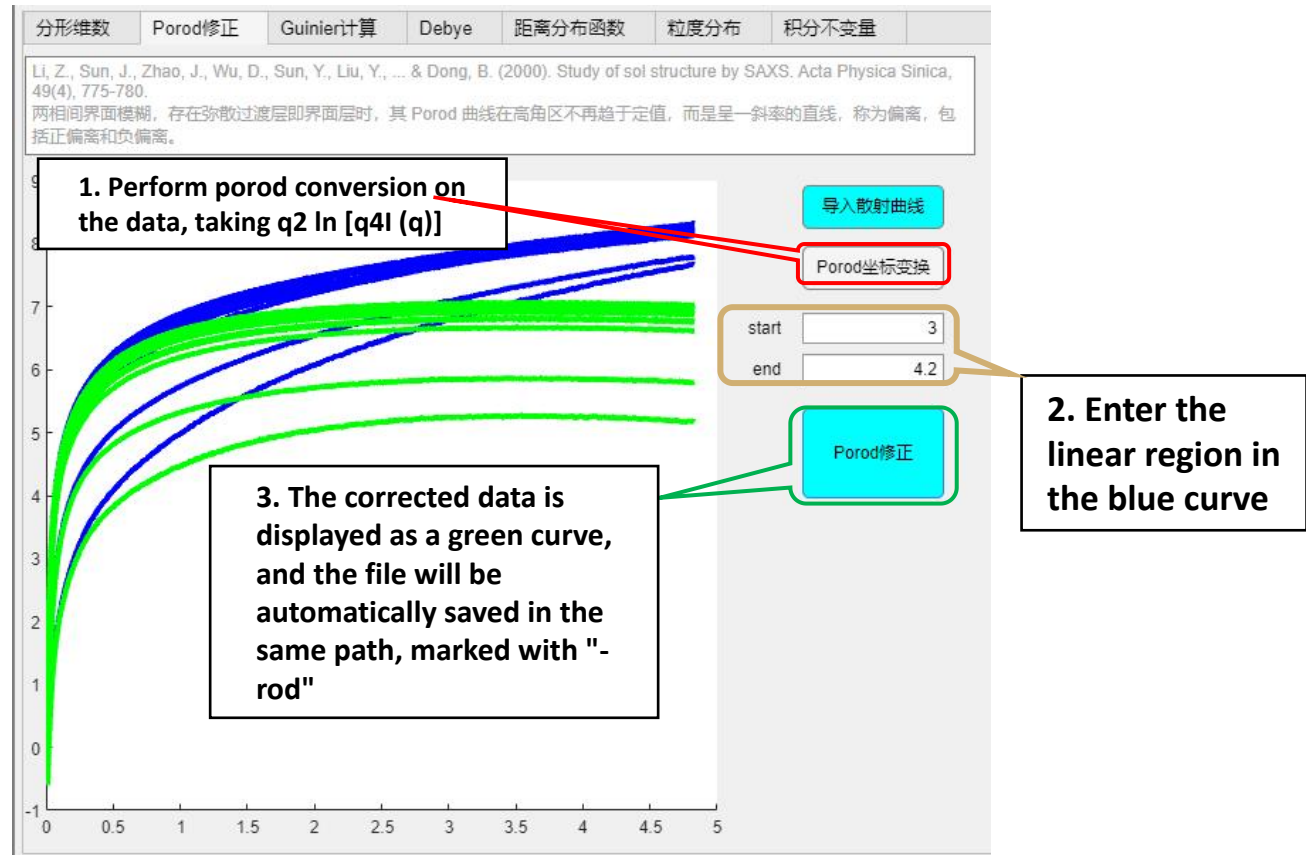
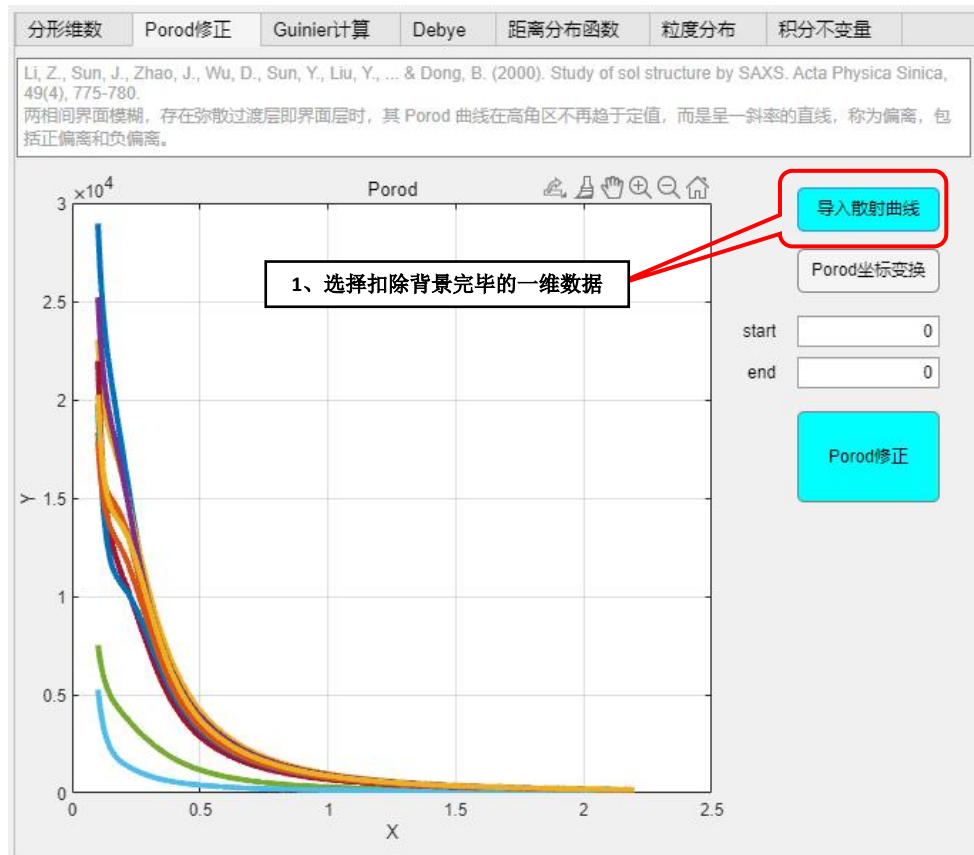


2.1. Fractal dimension



3. Results

2.2、Porod校正



2.3、Guinier

