About RHEED Convert

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* Outline explanation

This is a program that transforms the RHEED (Reflective High-Engration Electron Diffraction) pattern into an arrangement of reciprocal lattice rods viewed from directly above the surface. Reference books on electron diffraction include "Easy Electron Diffraction and Elementary Crystallography-Indexing of Electron Diffraction Figures" [Kyoritsu Shuppan, by Tanaka, Terauchi, and Tsuda], and "Surface / Interface Physics" on RHEED [Maruzen, Sone. Hen (new development of series physical physics)] etc.

※ Operating environment

This software is

- **CPU:** 68020 and above (should not have FPU), PowerPC series
- **Operating System:** Mac OS 7.5 or higher (Thread Manager required)

Works with. It's a Fat Binary, so it works best on both 68K Macintosh and Power Macintosh. He has developed it on 9500/200 and 7600/200 (both Mac OS 8J), and has confirmed the operation on 7100/120 (Mac OS 7.5.3J), but confirmed the operation on 68K Macintosh. Not available. It may also work on System 7.1, but I haven't confirmed it.

Please see here for an example of the execution result (24KB).

* Download

- rconv101.sit.hqx (program: 600KB)
- rconv_source.sit.hqx (source file: 1.2MB)

※ how to use

1. When started, a dialog will appear requesting a PICT file for the RHEED pattern to be converted. The image format is PICT only. Also, the converted image is forcibly converted to 256 gray.
2. When you specify a file, separate windows appear at the top and bottom, and the original RHEED pattern is displayed in the upper area. The two circles and one line in this represent the

specular reflection spot (green circle), the direct spot (red circle), and the shadow edge (blue line), respectively. Drag with the mouse so that these three markers match the RHEED pattern. Note that the shadow edge always maintains the relationship between the perpendicular bisectors of the two spots, so moving one will automatically adjust the other markers to meet this requirement.

3. After adjusting the position of the marker, enter the field of camera length or electron beam viewing angle above. The unit of camera length is pixel, and the unit of viewing angle is °. The distance D between the two spots specified above is always in the relationship of tan θ = D / 2L (θ: viewing angle, L: camera length), so if you enter one, the other will be calculated automatically. First of all, it is convenient to find the camera length using a photo with a known viewing angle. The last used camera length will be automatically adopted at the next startup.
4. After specifying the marker and value, press the <Convert> button. The conversion will start. The conversion can be done in the background, so you can convert multiple images at the same time or do other work during the conversion. To stop the conversion in the middle, press the <Stop> button (the display of Convert changes).
5. When the conversion is complete, the conversion result diagram will be displayed in the lower part of the window. The conversion result can be saved as PICT in the save menu. You can also use Drag & Drop to paste directly into other applications (must have Macintosh Drag & Drop installed on your system).
6. Once the conversion is complete, you can control-click the part of the image above to highlight the part corresponding to that position in the image below. Also, in the status display field next to the progress bar, the reciprocal lattice position at that time is displayed in coordinates with the 00 spot as the origin.

You can also cancel the file without opening it first, open a new document, and then drag and drop the image from another application to the top of the window.

* Option settings

Various settings can be made in Options of the File menu. The following is a brief description of the option items.

- **Conversion**

  Vertical Scale:
  : Stretches the conversion result vertically by the specified value. You can enter an integer value from 1 to 10.

- **Miscellaneous**

  Specular Spot, Direct Spot, Shadow Edge:
  : Specifies the color of the marker. Please click the part of the color on the right.

- **Save PICT as**

  Creator Field:
  : Specify the creator of the PICT file to save (the identification code of the application software that opens when double-clicked). The icon on the left is the document icon. If you don't know the code, press the <Choose> button on the right and select the application or the document created by that application. You can also drag and drop the icon of the target document from the Finder into the code entry field.

- **Buttons**

Revert to Default:
Resets the entire setting to the standard value.
Cancel: Cancel:
Cancels the setting change.
OK:
Save the settings and close the dialog.

Note that the option settings other than Vertical Scale are valid only for newly opened documents after changing the settings.

* Other general precautions

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The author does not make any compensation for any damage caused as a result of the calculation of this software, or for software hardware damage caused by software malfunction. Please use at your own risk.

This program should be used by anyone who has a good knowledge of his RHEED. If you do not have enough knowledge, please refer to various electron diffraction and surface physical characteristics textbooks. It is extremely dangerous to use this kind of software without knowing the meaning. In addition, it is prohibited to use the calculation results using this software for experimental reports.

The source code of this program is also available on the same web page. These codes may be modified and used within the scope of personal use. However, please refrain from publishing the modified application and / or source code without permission. In addition, we cannot accept questions regarding the contents of the source code. Note that you need Metrowerks CodeWarrior Pro for Macintosh and PowerPlant to compile this source code.

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