almost fast enough for real-time manipulations.

Documentation: The write up for *MACINPLOT*II is approximately 800 lines and can be supplied as an ASCII file or a MS Word 5.0 document.*

Availability: Copies of the program can be obtained by writing to the author. The program and documentation will be supplied on a 3.5 in double-sided double-density floppy disk formatted for the Macintosh. A nominal fee will be charged to cover the cost of the disk, or a blank disk can be sent with the request. In addition, the program has been deposited at the University of Illinois NCSA facility and can be accessed *via* standard file-transfer protocol (ftp.ncsa.uiuc.edu).

Keywords: Plotting, graphics, Macintosh.

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* The *MACINPLOT*II manual and a list of current users have been deposited with the British Library Document Supply Centre as Supplementary Publication No. SUP 55808 (21 pp.). Copies may be obtained through The Technical Editor, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England.

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LAYERGPD – a program to visualize the three-dimensional layer group general position diagrams. By S. Y. LITVIN and D. B. LITVIN, *Department of Physics,*

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The crystallographic problem: The standard representation of the general positions of three-dimensional groups is a two-dimensional diagram, a parallel projection of the general positions onto a plane. For each group, only a single diagram is given. Such is the case for the space groups (*International Tables for Crystallography*, 1989) and for the layer groups (Weber, 1929; Wood, 1964; Chapuis, 1966; *International Tables for Crystallography*, 1993). A second two-dimensional perspective general position diagram for some layer groups has been given by Grell, Krause & Grell (1988). The goal in developing *LAYERGPD* was to overcome, for the layer groups, the constraint of a single parallel view of the general positions. We provide the user with options to choose the orientation and type of view, parallel or projective, of the three-dimensional general positions.

Method of solution: A PHIGS (programmer's hierarchical interactive graphics system)-based development product (*Z*-PHIGS by Weiss Software, Lübeck, Germany) was used to create the three-dimensional general position diagrams. At each position, an atom is represented by a multicolored asymmetric triangular pyramid to aid visualization of the symmetry relationships among the general positions.

Software environment: *LAYERGPD* was written in TurboPascal6.0 and is compiled. The PHIGS system necessary to view the general positions is included. There are no overlays.

Hardware environment: The program runs under MS-DOS 3.1 or higher on an IBM-compatible PC with a math coprocessor, 2 Mbytes of expanded memory and at least a VGA color monitor. As this is a graphics-intensive program, a 486/25 or better microprocessor is recommended. If stored on hard disk, the program takes up 680 kbytes of disk space.

Program specifications: The program can be run from disk or installed onto a hard drive. Installation programs are provided. The program is interactive through the use of menus. The user chooses the appropriate video chip set to use, the layer group and a single or multiple view of the general positions.

The single view can be rotated independently about all three coordinate axes, zoomed and set to either a parallel or projective view.

Documentation: A 'readme' file is provided with initial instructions on running the program from disk or installing it onto and running it from a hard drive.

Availability: Copies of *LAYERGPD* can be obtained free of charge by sending a formatted 1.44 Mbyte 3.5 in disk to the second author (DBL).

Keywords: Layer group, general position diagram, three-dimensional visualization.

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