Space Group Visualizer for Monoclinic Space Groups

Eckhard Hitzer

Dep. of App. Physics, University of Fukui, 3-9-1 Bunkyo, 910-8507 Fukui, Japan

E-mail: hitzer@mech.fukui-u.ac.jp

Christian Perwass

Inst. for Informatik and Prakt. Math., Christ.-Alb. University of Kiel, 24118 Kiel, Germany

E-mail: chp@ks.informatik.uni-kiel.de

Abstract: A new free interactive OpenGL software tool is demonstrated, that visualizes all monoclinic space group symmetries described by geometric algebra.[1]

Keywords: crystal lattice, space group symmetry, geometric algebra, OpenGL, spacegroup visualizer
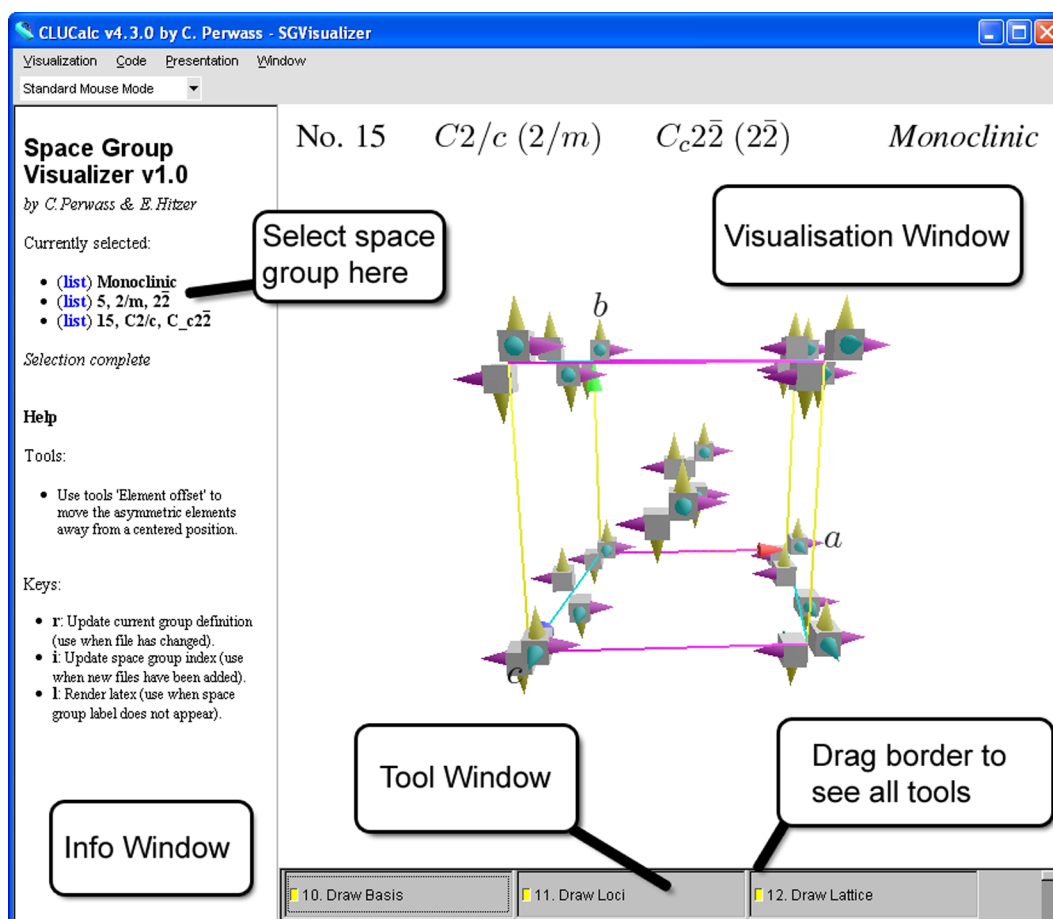
Fig.1 *Space Group Visualiser* main window.

1. Introduction

For space group visualizer uses the open source CLUCalc, which fully supports geometric algebra. Start up opens 3 windows: info, tools, and visualization. The symmetry choice is done by first selecting the crystal system (e.g. *monoclinic*) then the point group and finally the space group. The *tool windo*w at the bottom contains a number of tools that allow you to modify the visualization: Draw Basis, Loci, and Lattice; Lattice Type, Generator, Symmetry Generator (and Type), Cell

Count, Color and Lighting, Element Offset, cell *Angle*, and side *Len*gth. With the mouse buttons and the shift key you can freely rotate, translate and scale the visualization in 3D.

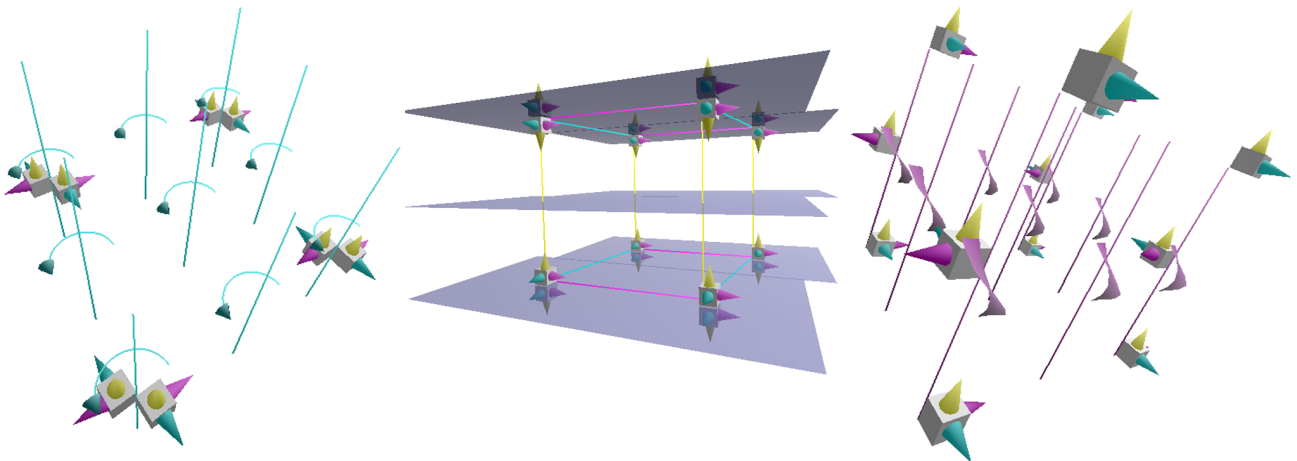Fig.2 Available tools in *Space Group Visualiser*.

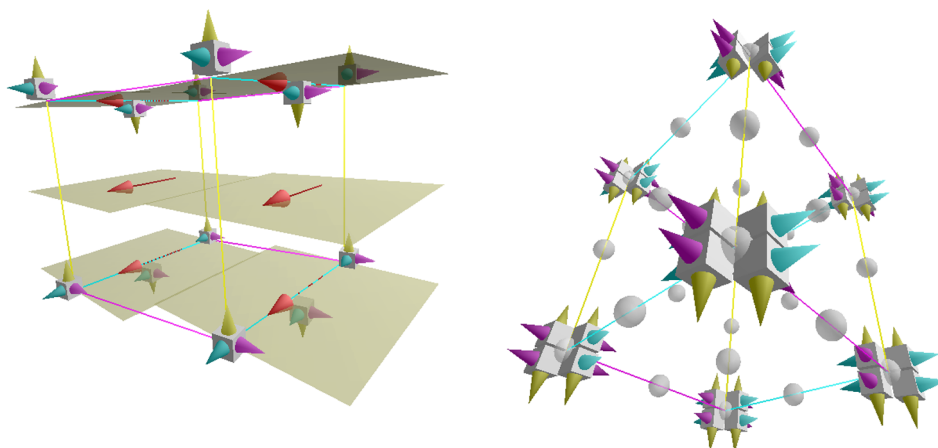Fig. 3. Symmetry visualizations: Rotational, reflection, and scew.

Fig.4 Visualisations of glide reflection and inversion.

2. References

[1] E. Hitzer, C. Perwass, Proc. Symp. on Adv. Mech. Eng., Pusan, Korea, Nov. 2005. http://sinai.mech.fukui-u.ac.jp/gcj/publications/, www.spacegroup.info/, www.clucalc.info