CaRIne Crystallography is a software which interactively deals with different geometrical representation of crystals:

- real lattices in 3D,
- surfaces,
- interfaces, grain boundaries,
- multi-layers,
- stereographic projection,
- reciprocal lattices in 2D and 3D,
- X-Ray diffraction patterns (XRD).

Those different functions are usually divided in several software. CaRIne brings them together in a friendly interface. This is time and cost saving. Moreover CaRIne displays in a clear way the relations which exist between the different representations which is all the most appreciated among the teaching world.

CaRIne is currently used in 30 countries by more than 1500 teams and laboratories for research and teaching in the physics and chemistry and materials science fields.

A fullproof and opened architecture

The 4.0 CaRIne software is organised around modular and upgradable projects which allow the addition of new modules for the next 4.x versions to come without modifying at all the software organisation.

The different projects also allow you to save your work in its integrity and even to send it to one of your colleagues or to students by simply making a copy of a file directory.

Multi-tasks : reactivity, rapidity, efficacy

To be even more modular, CaRIne 4.0 core has been completely rethought. Each element of a project is an autonomous process (thread). The elements of a project are waiting for events (request for rebuilding, refreshment) and thus give the hand to the user during execution. Several elements of different projects can deal with a same event in parallel. For instance, adding an atom in an cell generates a rebuilding event and this event can be sent simultaneously to different graphic representations defined from the cell, that is to say, that all the crystals originally built from this cell are updated simultaneously and instantaneously!

Surfaces and interfaces

The 4.0 version allows of course the building up of crystals made of several thousands of cells. But also, it is now possible to build up surfaces, grain boundaries and interfaces interactively with the help of graphic tools and 3D orientation of structures with the mouse.

A powerful and efficient graphic user interface

The new organisation of the graphic user interface allows to access rapidly to the parameters of crystallographic representations but also to the objects which they are built of by the intermediary of many interface elements such as context popup menus, dialog boxes and objects inspectors (inspectors are windows for which the contents are updated according to the active window).

More and more performing objects

The creation tools of the cell are completed by many options. It is possible to choose an equivalent position generator among the 14 Bravais lattices and the 230 space groups. The equivalent position generator defines the lattice and the node list is generated automatically.

In the 4.0 version the nodes of the lattice are objects as a whole, which is very important for teaching : indeed it is easy to build up a crystal by combining a lattice of points and a motif. The motif of a cell has not only a list of different atom positions but also a list of bonds between atoms and a list of coordination polyhedrons. The bonds and the polyhedrons are automatically searched for each building up of a crystallographic representation.

Many interactive tools have been added to modify or create 3D representations of crystals (interactive bond and polyhedron searching, distance indications...).

During the construction of a 3D representation, a track of all the modifications is kept and re-played for each building up. The (hkl) planes and the [uvw] directions are materialised and are used to orientate in a quick and precise way the crystallographic representations.

A powerful "crystallographic builder" has been developed for the 4.0 version and crystallographic representations can contain thousands of objects without penalizing the rapidity of execution of the program.
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