

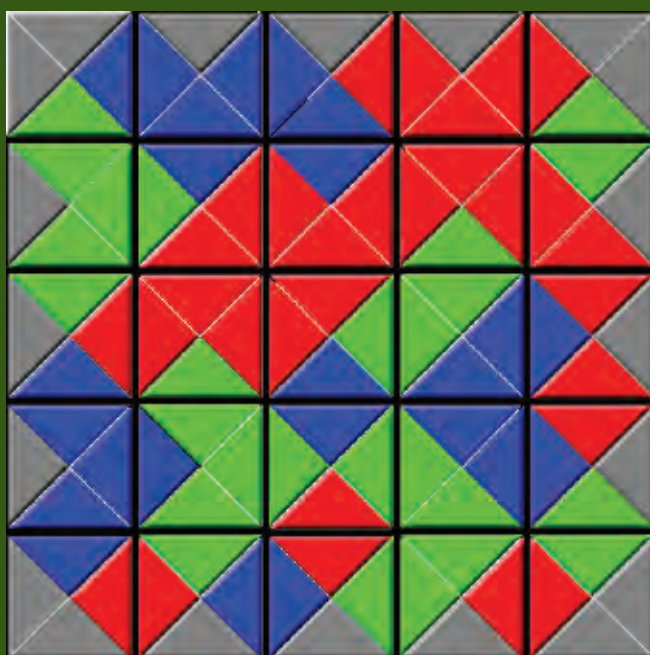
Veit Elser

“The Phase Problem and Related Computational Challenges”

Crystallographers and image-processing engineers have been reconstructing the missing phases of diffraction patterns for several decades, and almost independently of the algorithmic framework developed by computer scientists. Are the phasing algorithms in use today badly in need of a makeover, or is phasing so specialized it has nothing in common with more mainstream computational tasks?

This talk will address these questions indirectly. Listeners will get a 15-minute tutorial on writing their own high-performance phasing algorithm from scratch. The method is very general and lends itself to a great variety of applications, such as solving the jigsaw puzzle on this poster. The talk will conclude with a discussion of the computational challenges facing the proposal of imaging single macromolecules with a pulsed, x-ray free-electron laser source.

Veit Elser's early work in condensed matter physics was strongly influenced by a set of rhombohedral blocks he constructed as a graduate student that turned out to be useful in the theory of quasicrystals. Recently, his research has taken a computational turn, with the discovery that phase retrieval algorithms are surprisingly good at solving Sudoku puzzles. Elser received his Ph.D. from the University of California, Berkeley, in 1984. This was followed by four years at Bell Labs, and a move to Cornell University where he has been ever since.



Wednesday

October 3, 2007

3:00 p.m.

Bldg. 402 • APS Auditorium
Argonne National Laboratory

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