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	of 3D Images of Nanorice Particles from Diffraction Patterns of Two Particles in Independent Random Orientations with an X-ray Laser -- Nobel Symposium on Free Electron Laser Research.
Sommario/riassunto	X-ray free electron lasers (XFELs) deliver intense, coherent, femtosecond laser pulses in the X-ray range. The XFELs are opening two new research fields. One is to study ultrafast electronic and structural dynamics in various forms of matter. XFELs can make atoms and electrons in action visible. Another field is to study the non-linear interaction of the unprecedented intense X-ray pulse with matter. XFELs transform matter into its new form in extreme conditions that have never been reached. The present special issue provides an overview of the current status and future direction of the development of XFELs and the research fields opened by XFELs. Featured are reports on the status and plans of all FEL facilities in the world, i.e., FLASH in Germany, LCLS in USA, SACLA in Japan, FERMI in Italy, European XFEL, SwissFEL, PAL-XFEL in Korea, and Shanghai SXFEL in China. Reports are also included on instrumentations and on science at these facilities, as well as on the relevant theory.