SYSR 2 Hauptvortrag

Zeit: Samstag 09:00–09:30 Raum: TU HE101

Hauptvortrag SYSR 2.1 Sa 09:00 TU HE101

Biological x-ray microscopy: biochemical mapping of sperm and lensless imaging of yeast — •Chris Jacobsen — Department of Physics and Astronomy, Stony Brook University, Stony Brook, NY, USA

What's inside a cell? Much is known, thanks to light and electron microscopy. However, x rays offer new insights, by imaging whole cells at 20-40 nm resolution using zone plate lenses, and in particular by combining this with spectroscopic sensitivity to organic functional groups. While spectra of single compounds can provide exquisite information on electronic states, a cell is much more complex. Pattern recognition algorithms provide a way to deal with this complexity and obtain insights into biochemical organization at a fine spatial scale, as illustrated in an ongoing study of the correlation of morphology with biochemical content in sperm. Can one obtain better resolution than present x-ray lens technology allows? The purest form of measurement is to collect x rays scattered by a cell with no optics-imposed losses. By using iterative phasing algorithms, this diffraction data can be phased to deliver a real-space image of a complex cell (at present, 30 nm resolution in studies of freeze-dried yeast) with a possible ultimate extension to atomic resolution imaging of proteins using x-ray free electron lasers.