he is not limited to ultrathin graphite samples; he examines catalytic gasification of diamond, glassy carbon and coal.

In the steam gasification of coal to form syngas, for example, McKee has identified a cyclic series of reactions[3] involving alkali carbonate catalysts such as K_2CO_3. Dispersed catalyst particles channeling through the coal dig out three-dimensional honeycombs. In their travels, the surfaces of the particles experience a repeated oxidation–reduction cycle of interactions with the carbon and the steam—alternately forming free alkali metal and reforming the carbonate. This catalytic process is particularly attractive, McKee told us, because the alkali carbonates are cheap and abundant.

In these carbon gasification reactions one is not always interested in the gaseous reaction products. One concern is to find catalysts that will optimize the energy obtained from carbon combustion. There is also interest in finding the most efficient way of getting rid of carbon where it is simply a nuisance—as in soot suppression, and the deterioration of catalytic plates in petroleum cracking plants when they become coated with carbon. One wishes also to learn better ways of suppressing the unwanted gasification reactions that damage the graphite control rods of gas-cooled nuclear reactors. —BMS

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New synchrotron lab in Hamburg

The electron synchrotron and the e^+e^- storage ring DORIS at the German Electron-Synchrotron laboratory DESY, in Hamburg, have been providing experimenters with synchrotron radiation beams for more than a decade. With the increased demand for synchrotron radiation sources in recent years, and the transfer of high-energy-physics concentration at DESY from DORIS to the new, more energetic e^+e^- storage ring PETRA, it was decided at the end of 1977 to expand considerably the synchrotron radiation capabilities of DORIS. The recent ceremonial dedication of the new Hasylab marked the realization of this decision.

Hasylab (for Hamburg Synchrotron Radiation Laboratory) will coordinate all synchrotron radiation experimentation at DESY. These will be concentrated primarily in the recently completed, large Hasylab experimental hall. Before construction began, three years ago, a single synchrotron radiation beam line emerged from the segment of DORIS now adjoining the Hasylab hall. The new experimental hall will eventually incorporate six primary beam lines, one for each of the six bending magnets in the full quadrant of the DORIS ring covered by the Hasylab hall. Three of these synchrotron-radiation beams, including the rebuilt original beam line, are now ready for experiments. Each of the primary beam lines will branch into three or four secondary lines, leading ultimately to as many as two dozen experimental stations.

The director of the new Laboratory is Christof Kunz.

Electrons and positrons can circulate in DORIS at energies up to 5 GeV. Although both produce synchrotron radiation as they experience bending in the ring, the radiation beams in the Hasylab hall will come only from circulating electrons, generally with no countercirculating positrons; e^+e^- collisions tend to degrade the intensity of the synchrotron radiation. Because e^+e^- interactions are the *raison d'etre* of DORIS as far as high-energy physics is concerned, synchrotron radiation experiments will be carried out primarily during dedicated runs. In the past, such experiments were generally run simultaneously with high-energy experiments. It is estimated that 30 to 40% of DORIS running time will now be dedicated to synchrotron radiation work.

The preexisting European Molecular Biology Laboratory facility, located at the far end of the racetrack-shaped DORIS ring, works with synchrotron radiation from circulating positrons. This facility, run as an outstation of the central EMBL laboratory in Heidelberg, is also building three new experimental stations in the Hasylab hall.

A continuous, intense spectrum of photons from the infrared to hard x rays (up to 100 keV) will be available to experimenters at Hasylab. Until now, the Stanford Synchrotron Radiation Laboratory, using the e^+e^- storage ring SPEAR, has had something of a monopoly on hard x-ray synchrotron beams. Hasylab expects now to enter into serious competition with SSRL in x-ray scattering and EXAFS experimentation (PHYSICS TODAY, March, page 19). This emphasis on the x-ray portion of the spectrum takes into account the fact that a lower-energy synchrotron radiation source, BESSY, will soon be available in Berlin. BESSY, which will cover the vacuum ultraviolet spectrum, will be comparable to the University of Wisconsin's Aladdin and the smaller of the two sources under construction at Brookhaven's National Synchrotron Light Source.

Hasylab will not, however, neglect the vacuum ultraviolet region. Four experimental stations with normal-incidence crystal monochromators are planned for beam lines with 5- to 50-eV photons. Two of these are already in operation, doing high-resolution and fluorescence spectroscopy. The other two, now under construction, will do photoemission spectroscopy and angle-resolved photoemission studies.

For the ultraviolet region from 20 eV to 1 keV, the Hasylab hall will house seven experimental stations with glancing-incidence crystal monochromators, one of which is already in operation. These experimental facilities are intended for photoemission and reflection measurements, Fresnel zone-plate microscopy and x-ray fluorescence.

For the x-ray regime above 1 keV, twelve stations are planned; three of these will be run by EMBL. A Danish collaboration has built a three-axis diffractometer, and a large, four-circle diffractometer is under construction. Several focused x-ray beams will be devoted to EXAFS studies, and there will be facilities for x-ray interferometry, x-ray topography and Mössbauer studies.

The instruments at the experimental stations are for the most part built in collaboration with universities and other outside institutions. Many of these devices are intended ultimately to become "general user facilities." Hasylab will welcome outside user groups. Non-physics users, especially, will be offered technical assistance by the Hasylab staff in performing their experiments.

Because DORIS can run with up to 480 electron bunches circulating at once, it can achieve somewhat higher currents, and hence greater synchrotron radiation intensities from the bending magnets than Stanford's SPEAR. (On the other hand, the wiggler magnets at SPEAR provide higher intensity than DORIS at the high-energy end of the x-ray spectrum.) At a circulating energy of 2 GeV, the DORIS electron current can go up to 400 milliamps. The circulating electron bunches deliver pulsed synchrotron radiation to the experimental stations with pulse widths of about 150 picoseconds, at intervals as long as a microsecond between pulses. The synchrotron beam cross section is less than 2 mm^2 for 2-GeV electrons, growing to 11 mm^2 at the maximum DORIS energy. At this highest electron energy (5 GeV), the critical synchrotron wavelength of DORIS is about half an angstrom, putting the peak in the spectral distribution near 30 keV. —BMS□