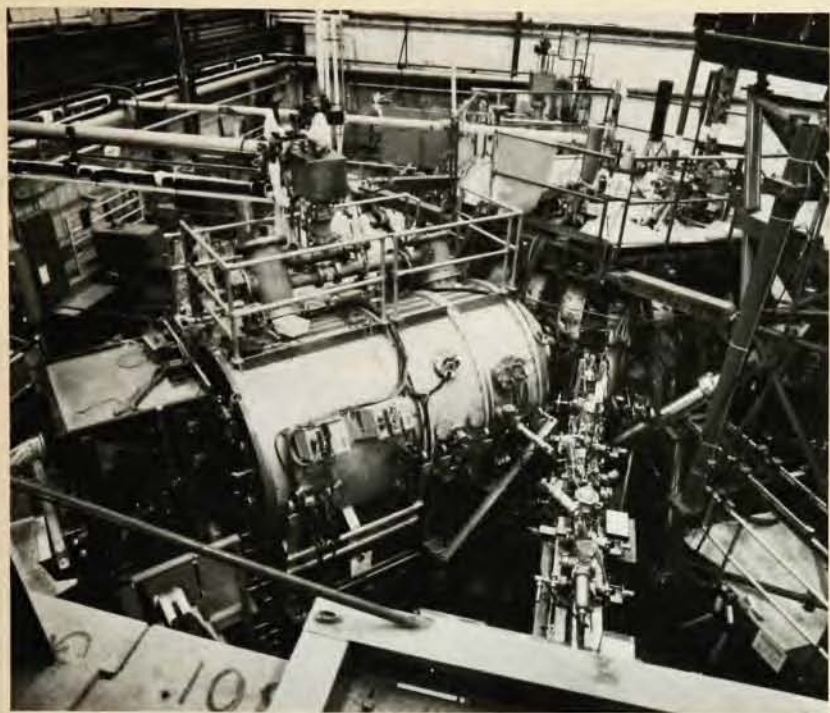




Neutral-beam injectors operating at Doublet III. The photo shows two of the neutral-beam injectors at the experimental fusion facility operated by General Atomic Company in San Diego; six such beam injectors will eventually be installed. Four of the injectors are now in place and can deposit up to 5 MW in the Doublet III plasma. Earlier experiments with 2 MW of heating power have produced plasma temperatures up to 10^7 K. The Doublet III experiments are a Japanese-US collaborative effort.

resolve the point-like quark current in the nucleus. The report identifies a variety of new experimental opportunities that would be made available by this high resolving power of a 4-GeV cw electron accelerator:

- Precision measurements of nucleon form factors at distances of the order of 0.1 fermi would clarify the spatial extension and quark substructure of protons and neutrons.
- Form-factor measurement and inelastic scattering processes in deuterium and other light nuclei "will be crucial" in studying the interface between conventional nuclear dynamics and QCD.
- Electro- and photoproduction of vector mesons by polarized electron beams would elucidate the spin properties of vector-meson coupling to nucleons. Such experiments can also study nucleon isobar propagation throughout the nuclear volume.
- As a "subsidiary recommendation," the Barnes Subcommittee suggests the construction of a 1-GeV, cw electron accelerator. At this lower energy, coincidence experiments looking simultaneously at the electron scattered off a complex nucleus and an emitted nucleon, deuteron or alpha are needed to map the quantum numbers and strengths of discrete excited nuclear states and giant resonances. Whereas

low-energy electrons can only knock nucleons out of outer nuclear shells, a 1-GeV beam can release nucleons that lie deeper inside the nucleus. At still higher energies, such studies will be relatively insensitive to final-state interactions, thus permitting good separation of transverse and longitudinal response functions in the study of single-nucleon hole states.

- Deep-inelastic electron scattering off complex nuclei can reveal quark substructure by the observation of deviations from single-nucleon additivity.
- Searches for parity violation in high-momentum-transfer elastic scattering off nuclei will provide tests of weak-interaction theories.

NSAC is expected to review the various proposals early next year and then make its recommendations to the funding agencies. The estimated cost of the SURA proposal is \$75 million, with an additional \$15 for spectrometers and other experimental equipment. "As we approach the energy regime previously reserved for elementary-particle physics," McCarthy told us, "we will need spectrometers as elaborate and costly as theirs." McCarthy stresses that SURA's linac-stretcher system can be upgraded to 6 GeV with relative ease. The SURA design can also accommodate supplementary rings to provide a dedicated synchrotron light source and

an internal-target storage ring.

Although the Argonne group has not yet made a firm cost estimate for the hexatron, Jackson points out that the use of the existing ZGS facility represents enormous potential savings. The replacement cost of the ring building and experimental hall, he estimates, is about \$50 million.

The 4-GeV proposals are all in the \$100-million realm; they are not likely to be in operation much before the end of the decade. In the interim, Demos suggests, the nuclear-physics community could make very good use of a 1-GeV cw electron accelerator that could be built quickly, at considerably lower cost. Echoing this sentiment in its subsidiary recommendation, the Barnes Subcommittee did not specify whether the 1- and 4-GeV accelerators should be built at the same facility.

Samuel Penner's group at the National Bureau of Standards plans to propose a high-current, cw, 1-GeV race-track microtron with a single, room-temperature linac. Previous attempts to produce cw microtrons of such a configuration with superconducting linacs have been limited to very low beam currents.

—BMS

IUPAP handbook on symbols and units

The International Union of Pure and Applied Physics is in the process of revising its handbook, "Symbols, Units and Nomenclature in Physics." To take into account the views of the wider physics community, the Commission conducting the review is soliciting comments and suggestions on any of the matters covered in the report.

Comments on Sections 1, 2, 3, and 9, covering general recommendations for physical quantities, units, numbers and international symbols for units, should be directed to Pierre Giacomo, Directeur, Bureau International des Poids et Mesures, Pavillon de Breteuil, F-92310 Sèvres, France.

Comments on Sections 4, 5, 6, 7, and 8, covering symbols for chemical elements, nuclides and particles, quantum states, nomenclature, recommended symbols for physical quantities, and recommended mathematical symbols, should be sent to E. Richard Cohen, Science Center, Rockwell International, 1049 Camino dos Rios, Thousand Oaks, CA 91360, USA.

Additional single copies of the handbook (document U.I.P. 20) can be obtained from R. C. Barber, Secretary, IUPAP Commission on SUN-AMCO, University of Manitoba, Department of Physics, Winnipeg, Manitoba R3T 2N2, Canada. If more than five copies are needed there will be a charge of \$0.50 per copy, plus handling charges. □