further improve precision of the data.

Experimenters at MIT plan to use a cold moderator that is now being installed at the MIT reactor to increase cold-neutron intensity; both the MIT and Oak Ridge groups expect to be doing experiments within a year.

Proton moment. To search for a proton electric dipole moment, P. G. H. Sandars, S. J. Wright and G. E. Harrison at Clarendon Laboratory, Oxford, have done high-precision molecular-beam-resonance experiments with thallium fluoride.[5] They interpret their null result as placing an upper limit of $(7 \pm 9) \times 10^{-21}$ e cm on the proton moment. —MSR

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Transition-Radiation Detector Shows Promise for High Energy

The transition-radiation detector being tested at Brookhaven National Laboratory appears to be a promising technique for identifying superhigh-energy particles. When a particle crosses the boundary between two media it emits electromagnetic radiation—"transition radiation." Such radiation needs a boundary, unlike bremsstrahlung, Cerenkov radiation or ordinary fluorescence.

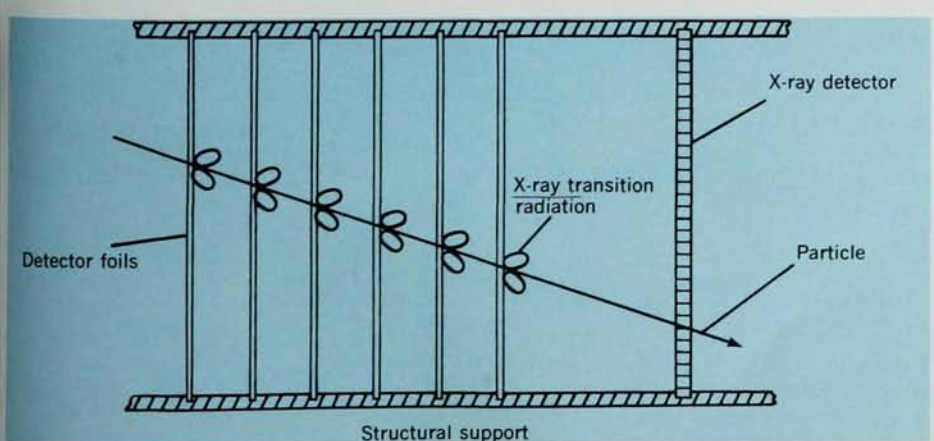
Theory had predicted that in the optical region the intensity of the radiation varies as log γ, where $\gamma = (1 - \beta^2)^{1/2}$, $\beta = v/c$ and v is particle velocity. Experiments by Luke Yuan and his collaborators over the last two years confirmed the logarithmic dependence.

A much more useful feature of the transition radiation, however, is that, in the x-ray region, theory predicted that intensity is linearly proportional to γ, or even better. Now Yuan, Ching Lin Wang and Sepp Prunster have made preliminary measurements (*Phys. Rev. Lett.* **123**, 496, 1969) in the x-ray region, in which the radiation is emitted by individual 2-GeV positrons at the Cambridge Electron Accelerator. The transition radiator is a stack of 231 thin aluminum foils, 25 microns thick and spaced 0.3 mm apart.

Positrons pass through a beam-defining scintillation-counter telescope, then through the transition radiator. A bending magnet then deflects the positrons into a scintillation counter. The x-ray transition radiation is measured by a lithium-drifted germanium detector. The Brookhaven experimenters estimate that 12 x-ray photons were produced by each positron. They now plan to try verifying the dependence of intensity.

Yuan points out that although detection of relativistic particles is comparatively easy, identification and selection of specific particles is a lot more difficult. Detection is done well by cloud and bubble chambers, solid-state and scintillation detectors, Cerenkov counters and photographic emulsions; all these respond to β. Yuan points out that because γ is much more sensitive to the mass of a high-energy particle than β, the transition-radiation detector offers a unique method of mass identification of monoenergetic particles in the superhigh-energy region.

Yuan, Anthony Favale and John Dooher (both of Grumman Aircraft) have proposed orbiting a high-energy physics experiment that puts the transition-radiation detector in tandem with the total-absorption nuclear-cascade (TANC) detector of Robert Hofstadter and collaborators (PHYSICS TODAY, May, page 58). The TANC would measure particle energy, and the transition-radiation detector could measure γ; so one could obtain particle rest mass. The transition-radiation detector could be calibrated with the 20-GeV electrons at SLAC, which have the same γ as 36 000-GeV protons.



TRANSITION-RADIATION DETECTOR. When particle crosses boundary between two media it emits x-ray transition radiation, whose intensity is expected to vary as log γ. Brookhaven detector has 231 thin aluminum foils.

International Space Project Will Study Solar Processes

NASA and its West German counterpart will coöperate in Project Helios, a space mission to study solar processes. According to an agreement signed in June, NASA will launch two German-built spacecraft on Atlas-Centaur rockets. The launchings, planned for 1974–75, will be approximately a year apart and will carry the space probes three tenths of the distance from the earth to the sun, further than any other flight now scheduled.

Ten experiments are planned in this exploration of the interplanetary medium, including studies of the solar wind and of electron plasma oscillations. Seven of the experiments are being planned by German scientists and the remainder by NASA in coöperation with American, Australian and Italian experimenters.

Another joint venture of the two countries will be an aeronomy satellite.

IN BRIEF

A 25-ton piece of CER-VIT (PHYSICS TODAY, February 1968, page 55) nonexpanding glass was poured in June. Ten minutes were required to pour the glass, which will form the mirror of the 158-inch (400-cm) telescope at the new Cerro Tololo Inter-American Observatory in Chile (PHYSICS TODAY, December 1967, page 59). □