the conversion efficiency is quite insensitive to the choice of numerical values of these parameters. The solar spectrum has been approximated by the distribution from a black body at a temperature of 5760°K with an integrated intensity at the earth's surface of 0.1 watt/cm^2.

Note that the conversion efficiency increases with the degree of doping because of an increase in the height of the potential barrier; that the band separation best matching the solar spectrum is, as noted above, 1.5–1.6 ev; and that the maximum obtainable efficiency (assuming that the saturation solubility of donors and acceptors is of the order of 10^{19}/cm^3) is roughly twenty five percent, corresponding to a power output of about 250 watts/meter^2 in full sunlight. A slight further increase in efficiency may be realized with the use of an optical collection system which increases the radiation intensity at the photocell surface. Note in addition that silicon is clearly a better choice for the present purpose than other materials that have been proposed[2,5,6] such as germanium and cadmium sulfide ($\Delta E = 2.4$ ev) but that silicon is in turn surpassed by aluminum antimonide. The superiority of AlSb over Si with respect to conversion efficiency would prevail even if the minority carrier lifetimes were lower by several orders of magnitude in the former material. The possibility of substantially improving the efficiency of experimental units over that heretofore realized[1] appears quite promising.

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Influence of the Geomagnetic Field on the Extensive Air Showers

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RECENTLY, Cocconi[1] published a paper on the influence of the geomagnetic field on the extensive air showers. According to this calculation the shape of the lateral spread of an extensive shower should not be circular, but elliptical, the main axis in the east-west direction being about twice as long as the other one.[2]

In July, 1954, we measured this effect on the top of Lomnický Štít (altitude 2634 m, 48° N geomagnetic latitude). We used two telescopes, each of which consisted of two trays of five argon-ethylene counters (two of them 40×500 mm, three of them 45×600 mm). The distance between these telescopes was 7 m. The separation of the trays of counters in the telescope was 800 mm. The telescopes were at the zenith angle of 45°, successively oriented towards east, west, north, and south; and fourfold coincidences were recorded. The results are as follows:

E: 45.2±2.9 coincidences per hour,
W: 50.1±2.6 coincidences per hour,
N: 38.3±2.3 coincidences per hour,
S: 38.5±2.3 coincidences per hour.

In view of the rather large statistical errors, we would not like to draw any conclusion about the precise value of the influence of the geomagnetic field on the extensive air showers, but it seems that our measurements prove the existence of such an effect. The measurements are being continued. A more complete paper, containing also a discussion of the results, will be published soon in the *Czechoslovakian Journal of Physics*.

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Coulomb Interference Effects in Proton-Proton Scattering*

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COULOMB interference effects in proton-proton scattering should be useful in discriminating between different combinations of phase shifts which equally well describe the cross section and polarization arising from purely nuclear interactions.[1] Calculations have been made of these effects for 200 Mev on the assumption only that s and p waves enter into the interaction.

In order to include the Coulomb interaction, the Møller formula for relativistic electron-electron scattering has been generalized by adding a Pauli term to the interaction Hamiltonian, to account for the proton's anomalous magnetic moment $\mu_a = 1.793$. The Coulomb scattering matrix so obtained may conveniently be written, correct through terms of order $1/\theta$,

$$M_c = M_{c+} + M_{c-},\quad M_{c-}{}^S(\theta,\phi) = (-1)^S M_{c+}(\pi-\theta, \pi-\phi),$$

$$M_{c+} = -\frac{\eta}{2k\sin^2(\theta/2)}\left[1 - \nu i\left(\frac{\boldsymbol{\sigma}_1+\boldsymbol{\sigma}_2}{2}\right)\cdot \mathbf{n}\sin\theta\right], \quad (1)$$

$$\nu = \frac{(\epsilon-1)}{(2\epsilon^2-1)}[(2\epsilon+1)+2\epsilon(\epsilon+1)\mu_a]. \quad (2)$$