The table lists data on the wavelength dependence of the transmission coefficient T for grids with different parameters (l - grid spacing, 2r - wire thickness). The polarization of the vector $\vec{E}$ is parallel to the wires. Using this table, we can choose the grid parameters such that it can be used successfully as a polarizer, analyzer, attenuator, filter, etc. In addition to the described Fabry-Perot interferometer, we also constructed a beam-splitting device with variable splitting coefficient, and a device of the Michelson interferometer type for measurements at liquid-nitrogen temperature.

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1) The theory of the passage of waves through such elements is considered in detail, for example, in [1-4].

2) The wires can be made parallel by producing a diffraction pattern with a gas laser.

SMALL-ANGLE SCATTERING OF PROTONS BY Mg^{24}

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Inelastic scattering of protons with excitation of the first-excited level of Mg^{24} (Q = 1.37 MeV) was investigated by Nemets and Prokopets [1] at an incident-proton energy 6.8 MeV. The results of the experiment show that whereas at medium and large scattering angles the scattering proceeds for the most part via compound nucleus production, at small angles an appreciable role should be played by some other mechanism.

To explain the experimental data obtained at these small angles with the aid of the theory of the Coulomb interaction it is necessary to assume a very large interaction radius. Taking into account the possible experimental errors at these angles, we decided to study inelastic small-angle proton scattering with semiconductor detectors, the use of which elimi-

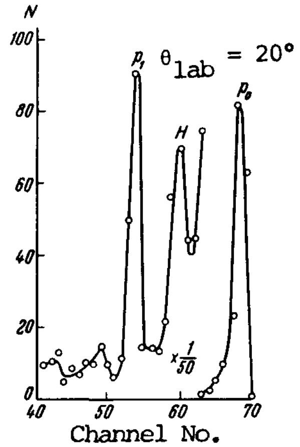

Fig. 1. Spectrum of protons scattered by a magnesium target at θ_p = 20° in the laboratory system.

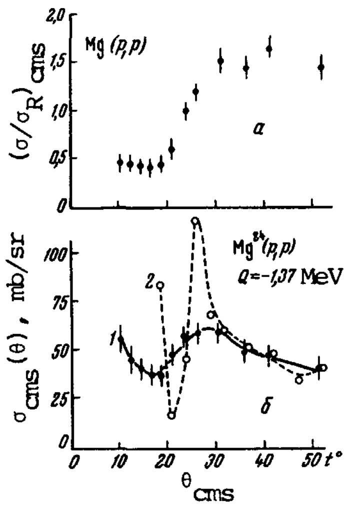

Fig. 2. Angular distribution of protons elastically (a) and inelastically scattered (b) by Mg^{24}. 1 - our data, 2 - results of Nemets and Prokopets[1].

nates the greater part of these errors.

The protons were obtained in the cyclotron of the Physics Institute in Bucharest by accelerating atomic-hydrogen ions. The incident beam was collimated with the aid of tantalum round plates of 1 mm inside diameter. The detector used was a silicon semiconductor, covered with a tantalum plate having a 2 mm hole. The monitor was a scintillation counter oriented 90° relative to the proton beam direction. The target was a thin rolled magnesium foil 1 mm/cm^2 thick. The measurements were made in steps of two degrees for the angles between 10 and 20° and in larger steps for larger angles.

Figure 1 shows a typical spectrum obtained when the proton counter is oriented at an angle of 20° (l.s.). The inelastic peak P_1 is well separated from the elastic peak P_0. The energy resolution for the elastic peak is 2%. Peak H in Fig. 1 corresponds to the hydrogen impurity in the magnesium target. The average energy of the incident protons in the middle of the target was determined by observing the scattering angle θ_{in}, for which the peak corresponding to elastic scattering by hydrogen coincides with the inelastic peak corresponding to inelastic scattering by Mg^{24}. In this case we used the relation:

$$E = \frac{AQ}{(1 - A)\sin^2\theta_{in}},$$

where A = 24 is the mass number of the target and Q = -1.37 MeV is the energy released in the reaction.

In our case θ_{in} = 26°45' and E = 7.06 ± 0.05 MeV. The absolute value of the cross section was obtained with account of the fact that the elastic scattering of the protons at an angle of 23° is pure Coulomb. Seward [2], in experiments on the scattering of protons by Mg^{24} in this energy region, normalized the experimental data in the same manner.

The results obtained are shown in Fig. 2. Figure 2a shows the angular variation of the ratio of the proton elastic scattering cross section to the Rutherford scattering cross section. We call attention to the decrease of this ratio with decreasing scattering angle. At angles smaller than 20°, the ratio σ/σ_R becomes < 1. A similar decrease in the ratio σ/σ_R

for small angles was obtained also by Hon Jeong et al. [3] at $E_p = 9.8$ MeV for the case of A^{40}. This small-angle behavior of the differential cross section casts doubts on the normalization method used by us and by Seward. The inelastic distribution of the protons is shown in Fig. 2b, together with the data of Nemets and Prokopets [1], obtained at $E_p = 6.8$ MeV (curve 2) and normalized to our data at an angle $\theta_{c.m.} = 52°$. At angles below 30°, our data do not agree with theirs. This may be partially due to a difference in the incident-proton energies. We are then dealing with a relatively strong change in the elastic cross section with changing energy in the small-angle region, which may be due to the contribution from the compound-nucleus formation mechanism. The change in the forms of the angular distributions of the curves in this region of energies was noted also by Seward [2] for medium and large angles.

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POSSIBLE VERIFICATION OF NONCONSERVATION OF TIME PARITY IN COLLIDING BEAM EXPERIMENTS

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To explain the recently observed $K_2^0 \rightarrow 2\pi$ decay [1], in which CP-invariance is clearly violated, several hypotheses were proposed. In particular, Okun' [2] and Prentky and Veltman [3] pointed out that the observed decay can be explained by assuming that there exists a new P-even but C- and CP(T)-odd interaction, the dimensionless coupling constant of which is $\sim 10^{-2}$. On the other hand, Bernstein, Feinberg, and Lee [4] called attention to the fact that at the present time there is no experimental proof whatever that electromagnetic interactions of strongly interacting particles are C- and T(CP)-invariant. Inasmuch as the coupling constant of the hypothetical interaction indicated above is of the order of the fine-structure constant α, they assumed this interaction to be electromagnetic. In the same paper [4], the authors discuss a larger number of experiments, with the aid of which their hypothesis can be checked.

In this letter we point out that the hypothesis of Bernstein, Feinberg, and Lee can also be verified in a series of experiments with colliding positron-electron beams. Installations with colliding positron-electron beams are now being readied for operation in several laboratories (Novosibirsk, Frascati, Orsay) (see [5]).

In the single photon approximation, C-invariance forbids many processes in the annihilation of a positron-electron pair into a pair of strongly interacting particles. However, these processes, namely

$$\text{a)}\ e^+ + e^- \rightarrow \gamma \rightarrow \pi^0 + \eta^0, \qquad \text{b)}\ e^+ + e^- \rightarrow \gamma \rightarrow \phi^0 + \rho^0,$$
$$\text{c)}\ e^+ + e^- \rightarrow \gamma \rightarrow \omega^0 + \rho^0, \qquad \text{d)}\ e^+ + e^- \rightarrow \gamma \rightarrow \phi^0 + \omega^0, \qquad (1)$$