practice one chooses first the chamber operating conditions, after which the discharge gap is adjusted to reduce the background of the extraneous sparks.

The table lists the data we obtained on the efficiency of each gap for different delays of the high-voltage pulse[1]. It is seen from the table that chambers with dielectric have a large "memory," good accuracy of trajectory localization, and a high particle registration efficiency (the measurements were made with the trajectories inclined < 10° to the vertical).

Interelectrode distance, mm	τ_{del}, sec	Efficiency of one gap, %	Mean square deviation of the spark from the trajectory, mm
3.5	2	99	~0.2 (for ~98% of the sparks)
5	2 20 50	99	~0.2 (for ~97% of the sparks)

We note that the registration of one particle in our chamber, which has six gaps, is equivalent to simultaneous registration of six particles (separated from one another by 5–15 cm) in a single discharge gap having six times the area of one chamber gap. From this point of view, our results indicate high efficiency of registration for showers of particles in "air" spark detectors with dielectric. We are planning to obtain in the nearest future more direct and more complete quantitative data on this question.

In conclusion we indicate that after this work was performed and reported by the Nor-Amberd School of Physicists [4], Matsukawa [5] published a paper devoted to an investigation of air chambers, in which he noted that he was unable to construct air chambers for the registration of particle showers by introducing a dielectric layer between the electrode and the working gas, since the glow of the entire working volume prevented the occurrence of localized sparks. It is this communication by Matsukawa which has induced us to write this letter. We have overcome this difficulty in air-argon chambers by increasing somewhat the interelectrode gap, increasing appreciably the working voltage, and "cutting off" the high-voltage pulse.

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1)V. M. Knyazev and S. A. Krylov participated in the measurements and in the data reduction.

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328

A 4 mm FABRY-PEROT MASER

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In shortening the working wavelength of beam masers a great deal of interest has been drawn to the use of a Fabry-Perot interferometer as a resonator,[1] the investigation of the characteristics of beam masers with this type of resonator, and above all the construction of the corresponding state separators and beam sources.

We have developed and operated a Fabry-Perot maser using the 1_{01}—0_{00} transition of the CH_2O molecule at a frequency of 72 838 Mc. The figure gives an idea of the construction used. The resonator consisted of two flat brass disks 6.5 cm in diameter, which were polished to an accuracy of the order of one micron. Gaskets made of vacuum rubber were placed between the disks, and the disks were drawn together by three screws, with the aid of which the parallelism and size of gap could be adjusted. The separation between the disks was $\lambda/2$ (about 2 mm), and the Q was 2000. This could be accurately adjusted by the pressure on the disks. Coupling was effected by means of two waveguides of like polarization whose ends opened into the resonator (see the figure). The resonator was fed with one flat beam of active molecules. The separator was a variant of the "ring" system suggested earlier by one of the authors.[1] It consisted of two plates, each of

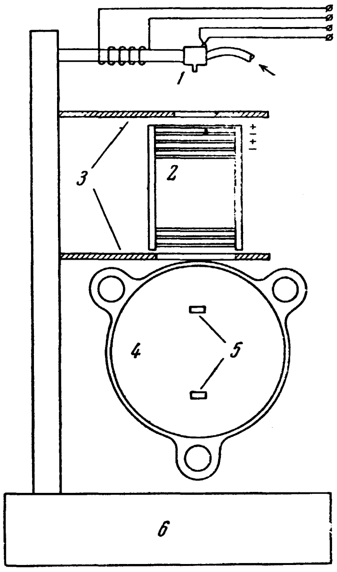

FIG. 1. Diagram of the working apparatus. One half of the separator and one of the disks of the resonator are removed. 1—source of the beam, with a thermocouple for regulating the cooling, 2—the state separator, which gives a flat, wide beam of active molecules, 3—the cold diaphragms, 4—the Fabry-Perot resonator, 5—the coupling holes, 6—dewar with liquid nitrogen.

which was an assembly of electrodes arranged perpendicular to the beam direction, charged alternately. The beam of molecules was directed into the gap between the plates. The separating system carried a voltage up to 15 kV. This system gave more than twice the number of active molecules than the usual quadrupolar system. Cold diaphragms with slits in them were located on both sides of the separator. A single beam source was used with a diameter of 0.6 mm. In order to increase the intensity of the line, the source was cooled to approximately −70°C, as recommended in [3] and also done previously in [2]. Contrary to the results in [4] a normal increase in the amplification factor to about 30 was observed before the establishment of oscillations. The spectral line in the resonator was observed to be a singlet with a width of the order of 15 kcs, as in the case of an ordinary resonator in the E_{010} mode. Unlike [5], the generation proceeded at one frequency. The signal-to-noise ratio during generation was not less than 20.

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329

SEARCH FOR THE DECAY $\omega \to e^+ + e^-$

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In theoretical papers, Zhizhin and Solov'ev [1] and Nambu and Sakurai [2] estimated the probability of ω decay via the scheme $\omega \to e^+ + e^-$. It was shown that the ratio $R = w(\omega \to e^+ + e^-)/w(\omega \to \pi^+ + \pi^- + \pi^0)$ should be of the order $\sim 10^{-2}$. In the present work, we attempted to detect the decay $\omega \to e^+ + e^-$ experimentally.

For this purpose, we studied the reaction

$$\pi^- + p \to n + X^0 \qquad (X^0 \to e^+ + e^-), \tag{1}$$

where X^0 is some neutral particle decaying via the scheme $X^0 \to e^+ + e^-$. For the study we used film obtained by us earlier [3] in a 17-liter xenon-propane bubble chamber exposed to 1.55 and 2.8 BeV/c π^--meson beams from the proton synchrotron at the Institute of Theoretical and Experimental Physics. The chamber was operated without a magnetic field.

The pictures were scanned for two-prong stars satisfying the following selection criteria: 1) both