Thus, the shift of the Curie point of the hydroselenite when the hydrogen is replaced by deuterium is of the same order of magnitude as that in KH_2PO_4 (90°), KH_2AsO_4 (66.4°), and $Ag_2H_3IO_6$ (40°)[3]. It can be assumed on this basis that these ferroelectrics have a similar spontanous-polarization mechanism in which an important role is played by the ordering of the hydrogen bonds.

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75-MICRON LASER

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The first laser design was proposed in 1958[1] in the form of an ammonia maser operating in the far infrared (several hundred microns). The actually constructed laser, however, operated in the visible region[2].

A proposal was made in 1959 to use a discharge-excited gas as the active medium[3]. This method makes it possible to construct lasers operating in a broad range of wavelengths. It is therefore of interest to construct a laser operating in the far infrared and using a gas discharge. In the design of gas lasers for the far infrared attention is usually paid to close levels of the higher states[4]. It must be noted that in Xe overlap of the p and d series takes place even for the lower states, so that lasing can be produced with a series of 3d → 2p transitions at relatively weak excitation. An attempt to obtain laser action with transitions of the 2p → 3d type may fail because of the rapid depletion of the 2p levels resulting from the short-wave spontaneous 2p → 1s transitions[5].

The transition with longest wavelength between the states 2p and 3d in Xe is $2p_5 \rightarrow 3d_5$ (75.5778 μ), the states of which have several distinctive features that make lasing possible in this transition. Moreover, we can

expect to obtain relatively high power with this transition, since lasing is effected at relatively low energy levels.

The upper $2p_5$ state is connected with only one of the 1s states, and should therefore have a lower probability of spontaneous decay compared with the other 2p states. The lower $3d_5$ state is coupled by strong transitions with the $2p_6$ and $2p_7$ levels, and also with the ground state. The undesirable reabsorption accompanying the strong coupling between the $3d_5$ level and the ground state can be reduced by decreasing the diameter of the discharge tube to a reasonable size.

Emission of a 75.5778 μ wavelength was effected by us in the mixtures He + Xe (100:1) at optimal pressure $p_{Xe} = 3.5 \times 10^{-2}$ mm Hg and Kr + Xe (3:1) at $p_{Xe} = (1.5 - 2) \times 10^{-2}$ mm Hg. A generator was used with high-frequency discharge and with internal confocal silvered mirrors with reflection coefficients 100 and 95%; the substrates were of crystalline quartz. The length of the discharge quartz tube was 1.80 m and the inside diameter was 6 mm.

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FREQUENCY DEPENDENCE OF THE THRESHOLD OF OPTICAL BREAKDOWN IN AIR

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The breakdown of a gas in the focus of an intense light wave, reported in[1-4], can be related either to cascade multiplication of free electrons (a theory of this process was presented in[5]) or to multiphoton processes