

Figure 1 Block diagram of the arrangement for measuring Hall emf in the vhf region

F-116/1 with the circuit shown in the block diagram (Figure 1)

The Hall probes showed a sensitivity at 78 K of 140–160  $\mu\text{V}/\text{mW}$ , which is not less than two orders of magnitude greater than the sensitivity of probes operating at room temperature. It can be seen from Figure 2 that the linear relation between Hall emf and vhf power is retained on cooling. The minimum recorded power flow propagating in the 3 cm band waveguide circuit is  $10^{-6}$  W. This is still not the minimum possible detectable vhf power for a cooled Hall probe. By using a high sensitivity amplifier with a sensitivity of  $10^{-8}$  V, it will be possible to detect a power of  $10^{-9}$ – $10^{-10}$  W.

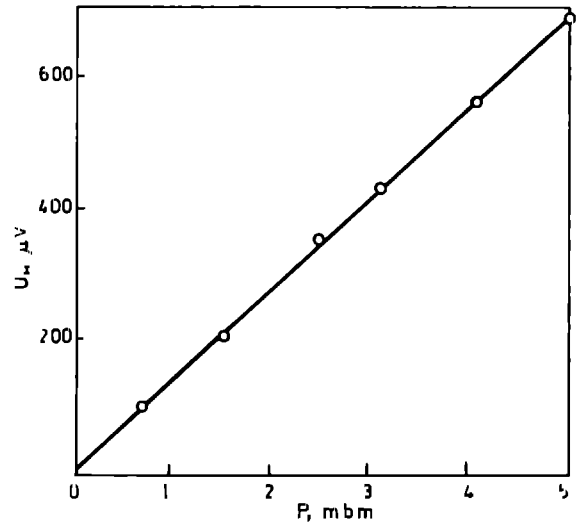


Figure 2. The dependence of Hall emf on transmitted vhf power

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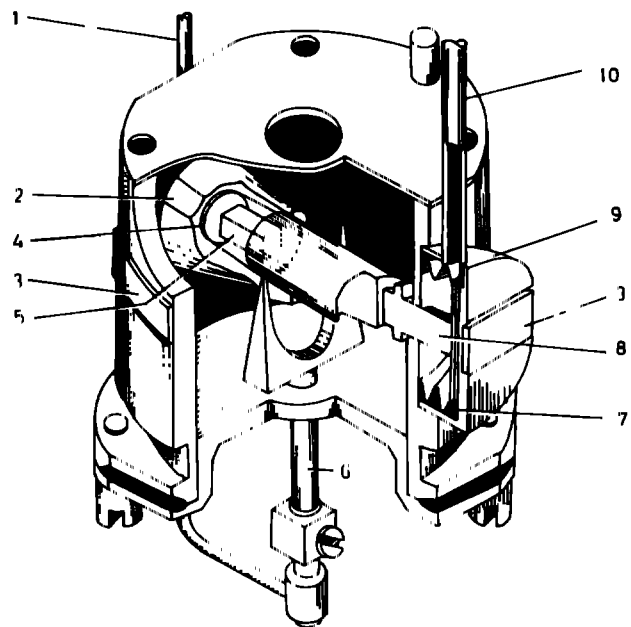
## A low temperature resonator for studying epr with application of uniaxial stress to the specimen

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The design of 3 cm band resonators in which the specimen can be directly compressed in a direction perpendicular to the external magnetic field is described in a number of articles<sup>1-4</sup> devoted to epr studies under uniaxial stress. Some problems require coincidence between the directions of stress and magnetic field and this can be achieved by a vice type arrangement,<sup>5,6</sup> but it requires an appreciable increase in the magnet gap and in the mechanical strength of the whole apparatus. The latter leads to an increase in dimensions and mass of the apparatus which is undesirable at helium temperatures. These difficulties can be overcome by using a bellows press<sup>7,8</sup> to produce the force on the specimen. This method is also very suitable when working at higher frequencies.

The 3 cm resonator with a cylindrical cavity for the  $H_{111}$  mode of oscillation is shown in Figure 1. The specimen, which is placed near the wall of the resonator in a plane-ended teflon jacket, is compressed by a rod of the same material which is rigidly connected to a thin-walled bellows. The force is produced by creating an

excess pressure in the outer chamber, using helium as the working gas. The force applied to the crystal is determined by the pressure in the chamber and the effective cross section of the bellows. The latter quantity was found with the help of a simple balance made for the



- |                          |                      |                    |
|--------------------------|----------------------|--------------------|
| 1 Rod for tuning element | 6 Base               | 7 Bellows          |
| 2 Jacket                 | 8 Polystyrene insert | 9 Pressure chamber |
| 3 Protective collar      | 9 Pressure chamber   | 10 Inlet tube      |
| 4 Cardboard washer       |                      |                    |
| 5 Specimen               |                      |                    |

Figure 1. Resonator with horizontal loading ( $\lambda = 3.2$  cm)

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