

The bottom end-face of the cavity is used to block the high pressure according to the uncompensated-area principle [8]. The reliability of the seal is ensured by high-quality grinding of the touching surfaces of the cavity and the shutter. It should be emphasized that conical inserts were used previously as a sealing element; these inserts simultaneously serve as the leads for input of microwave power into the cavity. Such a system did not allow the coupling of the cavity with the waveguide channel to be varied, and this complicated the tuning of the spectrometer. The latter is especially important for operation under pressure. Free access to the cavity from the bottom end-face allows the coupling with the cavity to be varied over side limits by moving a coaxial line in the shutter aperture. Such operation is possible even in the presence of pressure in the vessel.

The high-pressure vessel constitutes a fixed-pressure device. The construction of the vessel, the method of producing the pressure, and its measurements have been described in [9]. A mixture of transformer oil with kerosene is used as the medium which transmits the pressure to the sample.

The operating capacity of the overall system can be evaluated according to the shift of the resonance field with pressure. As a trial object, we chose yttrium ferrite garnet ($Y_3Fe_5O_{12}$) having a spherical shape 0.2 mm in diameter. The absorption line was observed on an oscilloscope, and the resonance value of the field was measured by a nuclear magnetometer. When the constant magnetic field was aligned along the crystallographic direction (100), an increase in the resonance value of the field with pressure was observed; the coefficient of this increase was 3.3 ± 0.5 Oe/kbar. The hydrostatic nature of the pressure can be evaluated from the absence of noticeable broadening of the resonance line under pressure (line width 1.5 Oe). (When paraffin was used as the pressure-transmitting medium, the line broadened severalfold at pressures of 6 kbar at room temperature.)

Thus, the instrument described allows measurement of the effect of pressure at liquid-helium temperatures on resonance absorption in para- and ferromagnets.

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