A new way to generate a rotating magnetic field in the high frequency range

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The article describes a new method of generating a rotating magnetic field of high frequency. This new measuring system is built of a magnetic circuit consisting of a ferrite torus, inside of which there are three L_P windings wound on ferrite cores connected in parallel with C_P capacitors. Between the three rectangular voltage signals shifted by 120 angular degrees and the L_PC_P circuits, three serial L_SC_S circuits that constitute the band-pass filter circuit are connected. In this way, the system can be powered by both sinusoidal and square signals. This significantly reduces the cost of the entire device. The necessary conditions for the phenomenon of thermal energy released in a magnetic fluid placed in a high-frequency rotating magnetic field are given. The author presents the preliminary results of the calorimetric effect in a magnetic fluid caused by a rotating (RMF) and alternating (AMF) magnetic field. The same sample of the magnetic fluid with magnetite nanoparticles and the oil (as a carrier liquid) was influenced by both fields. The value of the heating rate temperature $(dT/dt)_{t=0}$ in the experiment and its dependence on the intensity of the magnetic field were determined. Taking into account the parameters of both experiments carried out under slightly different conditions, the intrising loss power (ILP) was calculated in order to compare their effects. The obtained results indicate that the effect in RMF is more than two times greater than in AMF. This allows a significant reduction in the mass of the magnetic material needed to produce a similar thermal effect in medical applications.

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