

METHODS OF MAGNETIC FIELD CALCULATIONS
IN THE SUPERCONDUCTING CYCLOTRON

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Main coils of superconducting type in conjunction with iron sectors are the basic elements of the superconducting isochronous cyclotron.

The magnetic field in the median plane is determined as a superposition of fields generated by current carrying conductors and iron sectors in saturation. Methods of determining the magnetic field of various combinations of parallel and circular current contours are given, and the form factors of the main coil and trim coils are determined.

Homogeneous magnetization approximation is applied to the calculation of magnetic field contribution of iron sectors. The resultant field is Fourier analysed and the focusing properties of the magnet are determined.