

## **Design and Optimization the Magnet and Magnetic Structure for 80 MeV H- Isochronous Cyclotron,**

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Physics Institute - The design and construction of 80 MeV  
H<sup>-</sup> cyclotron is being in progress at PNPI. The cyclotron is  
intended both for extending the traditional for PNPI basic  
physics researches and for production of high quality  
radioisotopes for a medicine. To reduce the expenditures it  
was decided to use the existing in the institute infrastructure:  
buildings, cranes, energy supply systems, ventilation,  
water cooler systems. The cyclotron magnet was designed  
to use the iron of the model magnet of the operated 1 GeV  
synchrocyclotron. Parallel with traditional requirements for  
the magnetic field of the isochronous cyclotron the addi-  
tional demands are made in our case: final energy must be  
as high as possible for a given magnet; H<sup>-</sup> electromagnetic  
dissociation must be as low as possible to confine the beam  
losses in the limit of 5%; magnetic circuit must be  
optimized to reduce electric power consumption. The  
design of the magnet was done by using 2D computer code  
POISSON and model measurements with the scale  
 $K = 1.3(3)$  and  $K = 8$ . As a result of consideration it  
was concluded that for H<sup>-</sup>-cyclotron is reasonable to use  
magnetic structure with a high spiral angle and low value of  
flatter.