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Mathematical simulation of the unclosed 2-G HTS shield

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The mathematical model based upon the authors'previously introduced unclosed shield physical conception was developed. This model allows calculation of the magnetic field radial and longitudinal components in shield systems. One-dimensional problem of a thin-wall coil with the unclosed shield for the various relative positions of the shield and the solenoid was solved. Evaluation of magnetic field homogeneity was carried out. Verification of the model was made on the small-size shields. The developed model makes it possible to calculate shield parameters subject to solenoid magnetic field characteristics and shield material.

The obtained results are necessary to construct systems with the high magnetic field homogeneity, in particular, for the electron cooling system of charged particle beams at the new accelerator complex which is being developed at JINR in Dubna, Russia.

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