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Conceptual design of the mobile cryomagnets for novel microwave technologies

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There are demands for mobile microwave power sources for different applications, such as the rock melting and drilling, for example. The 28 GHz gyrotron has been proposed as radiation source for such purpose [1]. For frequency ~ 28 -30 GHz or more magnetic field ~ 1 -3 T are needed for resonance interaction of the electron beam with eigenmodes of a circular waveguide at gyrodevices. Magnetic fields ~ 1 T could be realized with usual copper magnets or with permanent magnets but for higher fields superconducting magnets should be necessary. In this paper we consider development of superconducting magnet with ~ 3 T field along with the mobile cryostat for it. Approaches with high temperature and low temperature superconductors are compared. The design of the possible mobile cryostat is presented and discussed.

1. Paul P. Woskov, Herbert H. Einstein and Kenneth D. Oglesby, Conceptual design of the magnet for millimeter waves rock melts, 2014 39th International Conference on Infrared, Millimeter, and Terahertz waves (IRMMW-THz), DOI: 10.1109/IRMMW-THz.2014.6955993

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