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Globus-M2 Design Peculiarities and Status of the Tokamak Upgrade

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The Globus-M spherical tokamak has demonstrated practically all of the project objectives. The main factor, limiting further enhancement of plasma parameters, is the relatively low toroidal magnetic field. The increasing of the magnetic field up to 1.0 T together with the plasma current up to 0.5 MA will entail serious rise in loads on the magnetic system in the upgraded tokamak Globus-M2. Thereupon a review of the design was developed. The vacuum vessel remains the same in order to reduce project cost. Results of the complete 3-D finite element model thermal and stress analysis are presented for the novel magnetic system. The mechanical strength was enhanced significantly. Radius of the toroidal field coil outer limb was enlarged slightly in order to reduce field ripples. The central column and the toroidal field coil joints were fully redesigned. As far as Globus-M2 poloidal field coil positions did not changed with respect to Globus-M, it allows keeping the full set of plasma magnetic configurations available in the existing machine. Final design of the tokamak upgrade is discussed in the report as well as current status of the work.

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