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On the magnetic field concentration in solar coronal loops

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The equilibrium of the axisymmetric cylindrical magnetic flux rope under solar coronal conditions in the light of the paradigms of Severny and Parker connected with the existence of neutralized and non-neutralized electric currents in the solar photosphere is considered. Based on the generalized Gold-Hoyle force-free magnetic field configuration it has been shown that only the non-shielded (non-neutralized) flux ropes can provide the sufficiently strong (> 100 G) magnetic field concentration at quite small (< 10) values of the number of turns of magnetic field lines over the loop length. The formation of corona flux ropes and their MHD stability are discussed.

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