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Physical Design and Transport Simulation of the STOR-U Tokamak[1] DAZHI LIU, CHIJIN XIAO, AKIRA HIROSE, Plasma Physics Laboratory, University of Saskatchewan — The Saskatchewan TORus Upgraded (STOR-U) tokamak is a new spherical tokamak (ST) with tight aspect ratio = 1.7, plasma major/minor radius = 55/32 cm, plasma current 2 MA and 1.5 T toroidal field. The research scope of the STOR-U project covers ST engineering, high β plasma confinement and transport, advanced plasma fueling by compact torus injection, helicity injection for plasma start-up and development of advanced plasma diagnostics. In this presentation, design and numerical studies on STOR-U toroidal/poloidal field systems are described. Various plasma equilibria have been obtained to meet the discharge requirements through variation in elongation, ($k \leq 3$), triangularity ($\Delta \leq 0.5$) and divertor configurations. The poloidal coil current waveforms have been determined for plasma breakdown and start-up. In addition, STOR-U plasma transport simulations have been carried out using the ASTRA code. The results reveal that, compared with purely ohmic heating, 3MW NBI heating significantly increases both T_i and T_e by 46% and 15%, achieving 2.4 and 2.2 keV (at center), respectively. Bootstrap current ratio, f_{bs}, is larger than 50%. Results of simulation with different transport models are also presented.

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