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Design Status of the Urania Experiment[1] A.C. PALMER, M.W. BONGARD, R.J. FONCK, B.T. LEWICKI, J.A. REUSCH, G.R. WINZ, University of Wisconsin-Madison — The URANIA experiment is a conversion of the PEGASUS spherical tokamak experiment designed to support $B_T = 0.6$–0.9 T operation ($4\times$–$6\times$ PEGASUS values) for up to 100 ms. It includes new: center rod; outer TF coil system; torque plate assemblies; and integrated divertor coils. The center rod system is comprised of 24 water-cooled, insulated wedge conductors placed inside a new inner vacuum wall. There is no Ohmic solenoid, which allows sufficient Cu for the ≤ 72 kA/turn current while retaining aspect ratios as low as 1.17. The outer TF conductors are 12 pairs of air-cooled, reinforced C-shaped plate conductors. Pairwise crossed conductor links connect the outer C-plates to the central rod conductors to eliminate the need for a toroidal compensation wind-back coil. Torque plate assemblies on top and bottom consist of several insulating plates that mechanically secure both the outer C-conductors and the interconnecting links. This torque plate assembly counteracts torsional magnetic loads and provides compliance for vertical displacement. The assembly accommodates MN magnetic forces and limits the axial excursion of the central assembly to <1 mm. This leads to tolerable tensile and compressive loads on the center rod assembly that arise from magnetic and thermal expansion. This allows a robust, fixed electrical joint design for the TF coils in the critical high-stress core region. That joint employs a belt and compression wedge approach developed on PEGASUS to provide 30 MPa of contact pressure for the 72 kA electrical connection.

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