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Constraining the Topology of the Universe Neil J. Cornish Department of Physics, Montana State University, Bozeman, MT 59717 David N. Spergel Department of Astrophysical Sciences, Princeton University, Princeton, NJ 08544 Glenn D. Starkman Center for Education and Research in Cosmology and Astrophysics, Department of Physics, Case Western Reserve University, Cleveland, OH 44106–7079

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abstract The first year data from the Wilkinson Microwave Anisotropy Probe are used to place stringent constraints on the topology of the Universe. We search for pairs of circles on the sky with similar temperature patterns along each circle. We restrict the search to back-to-back circle pairs, and to nearly back-to-back circle pairs, as this covers the majority of the topologies that one might hope to detect in a nearly flat universe. We do not find any matched circles with radius greater than 25°. For a wide class of models, the non-detection rules out the possibility that we live in a universe with topology scale smaller than 24 Gpc.