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Xiaoya Zha* (xzha@mtsu.edu), Department of Mathematical Sciences, Middle Tennessee State University, Murfreesboro, TN 37132. *Edge Partition of Graphs Embeddable in the Projective Plane and the Klein Bottle.*

In a previous paper we show that every non-planar toroidal graph can be edge partitioned into a planar graph and an outerplanar graph. This edge partition then implies some results in thickness and outerthickness of toroidal graphs. In particular, if each planar graph has outerthickness at most 2 (conjectured by Chartrand, Geller and Hedetniemi in 1971 and the confirmation of the conjecture was announced by Gonçalves in 2005), then the outerthickness of toroidal graphs is at most 3 which is the best possible due to K_7 .

In this talk we continue to study the edge partition for projective planar graphs and Klein bottle embeddable graphs. We show that (1) every non-planar but projective planar graph can be edge partitioned into a planar graph and a union of caterpillar trees; and (2) every non-planar Klein bottle embeddable graph can be edge partitioned into a planar graph and a subgraph of two vertex amalgamation of a caterpillar tree with a cycle with pendant edges. As consequences, the thickness of projective planar graphs and Klein bottle embeddable graphs are at most 2, which are the best possible, and the outerthickness of these graphs are at most 3. (Received August 10, 2020)