1117-05-279 **Michael D. Plummer** (michael.d.plummer@vanderbilt.edu), Department of Mathematics, Vanderbilt University, Nashville, TN 37125, **Dong Ye*** (dong.ye@mtsu.edu), Department of Mathematical Sciences, Middle Tennessee State University, Murfreesboro, TN 37132, and **Xiaoya Zha** (xiaoya.zha@mtsu.edu), Department of Mathematical Sciences, Middle Tennessee State University, Murfreesboro, TN 37132. *On W_v-Paths in Polyhedral Maps on Surfaces.*

The W_v-path conjecture states that any two vertices of a simple polytope can be joined by a path that does not revisit any facet. This is equivalent to the well-known Hirsch Conjecture. Klee conjectured even more, namely that the W_v-conjecture is true for all general cell complexes. Klee proved that the W_v-conjecture is true for 3-polytope (3-connected plane graphs). The general W_v-path conjecture was verified for projective plane and torus by Barnette, and the Klein bottle by Pulapaka and Vince. Recently, however, Santos disproved the Hirsch conjecture.

For every surface Σ, define a function $f(\Sigma)$ such that if for every graph polyhedrally embedded in Σ and for every pair of vertices x and y in $V(G)$, $\kappa_G(x,y) \geq f(\Sigma)$, then there exists a W_v-path joining x and y. Let $\chi(\Sigma)$ be the Euler characteristic of Σ. We show that $f(\Sigma) = 3$ if Σ is the sphere, and for all other surfaces $3 - \tau(\Sigma) \leq f(\Sigma) \leq 9 - 4\chi(\Sigma)$, where $\tau(\Sigma) = \chi(\Sigma)$ if $\chi(\Sigma) < -1$ and 0 otherwise. Further, if x and y are not cofacial, we show that G has at least $\kappa_G(x,y) + 4\chi(\Sigma) - 8$ internally disjoint W_v-paths joining x and y. The bound is sharp for the sphere. (Received January 16, 2016)