1125-AF-354 **Veronika Irvine*** (veronikairvine@gmail.com). *TesseLace: An interesting family of doubly-periodic alternating braids.*

Bobbin lace is a 500-year-old art form in which threads are braided in an alternating manner to produce a lace fabric. A key component in its construction is a small pattern, called a bobbin lace ground, which is repeated periodically in two dimensions to fill a region of any size. I have developed a mathematical model for bobbin lace grounds representing the structure as the pair $(\Delta(G), \zeta(v))$ where $\Delta(G)$ is a 2-regular digraph G embedded on the torus and $\zeta(v)$ is a mapping from the vertices of G to a set of braid words. The properties $\Delta(G)$ must possess in order to produce workable lace along with an equivalence relation will be presented. These criteria are used to prove that an infinite number of prime bobbin lace grounds exist and to exhaustively enumerate and generate results for increasing numbers of vertices in G. Over 5 million workable patterns have been identified, well in excess of the roughly 1,000 found in lace ground catalogs. To draw out of these results some of the more aesthetically interesting examples for lacemakers, the combinatorial search was tailored to select patterns with a high degree of symmetry. Lace ground representatives from each of the 17 planar periodic symmetry groups have been found. (Received August 29, 2016)