1106-20-2387 **Michael Kinyon*** (mkinyon@du.edu), Department of Mathematics, 2280 S. Vine St, University of Denver, Denver, CO 80208. *Automorphic Loops and their Permutation Groups.*

An important permutation group associated with a loop Q is its multiplication group $\mathrm{Mlt}(Q)$ generated by all left translations $L_x : y \mapsto xy$ and all right translations $R_x : y \mapsto yx$. The stabilizer of the identity element of Q is the inner mapping group $\mathrm{Inn}(Q)$. A loop is *automorphic* if every inner mapping is an automorphism of Q. Groups and commutative Moufang loops are examples of automorphic loops, but there are many others as well.

The outstanding open problem in the theory of automorphic is to determine if there are any finite, nonassociative, simple automorphic loops. Simplicity of a loop Q is characterized by $\mathrm{Mlt}(Q)$ acting primitively on Q, and thus one approach to searching for simple loops is to use the O'Nan-Scott classification.

In this talk, I will describe the current state of the art in the search for finite, nonassociative, simple automorphic loops. This is joint work with many people, most recently Peter Cameron and Dimitri Leemans. (Received September 16, 2014)