1106-20-1520 **Dmytro M Savchuk*** (savchuk@usf.edu), Department of Mathematics and Statistics, Unviersity of South Florida, 4202 E Fowler Ave, CMC 342, Tampa, FL 33620, **Ines Klimann** (klimann@liafa.univ-paris-diderot.fr), LIAFA - Université Paris Diderot-Paris7, Case 7014, F-75205, Paris, France, and **Matthieu Picantin** (picantin@liafa.univ-paris-diderot.fr), LIAFA - Université Paris Diderot-Paris7, Case 7014, F-75205, Paris, France. *Orbit automata as a new tool to attack finiteness problem for automaton groups.* Preliminary report.

We introduce a new tool, called the orbit automaton, that describes the action of an automaton group G on the subtrees corresponding to the orbits of G on levels of the tree. In particular, we provide the connection between G and the group generated by the orbit automaton and use it to deduce infiniteness of some automaton groups for which other methods did not work. Further, we show that for each automaton group there is only finite number of different orbit automata up to equivalence. (Received September 13, 2014)