1154-11-395 **Andrea Ferraguti*** (and.ferraguti@gmail.com), Madrid, Spain, **Carlo Pagano**, Bonn, Germany, and **Daniele Casazza**, Madrid, Spain. *The inverse problem for arboreal Galois representations of index two.*

Let F be a field of characteristic not 2 and f be a monic and quadratic polynomial with coefficients in F. Let Ω_∞ be the automorphism group of the infinite tree associated to f, and let $M \leq \Omega_\infty$ be a given maximal subgroup. In this talk, I will first explain how to produce necessary and sufficient conditions, depending exclusively on the post-critical orbit of f, for the arboreal representation ρ_f to have image equal to M. Our way of thinking allows to quickly recover classical results, such as Stoll's criterion for surjectivity and infinite index image for PCF quadratic polynomial, from a structural point of view that does not involve the use of ramification theory. Next, I will provide infinite families of examples for polynomials of the form $x^2 + a$ over the rationals. Finally, I will briefly show how to prove that any two closed subgroups of Ω_∞ of index at most 2 are non-isomorphic as topological groups. This involves the use of a new invariant for topological groups endowed with a system of topological generators named *graph of commutativity.* (Received September 03, 2019)