1163-14-128 **Alice Garbagnati*** (alice.garbagnati@unimi.it), Dipartimento di Matematica, via Saldini, 50, I-20133 Milan, Mi, Italy. *Symplectic automorphisms of order 3 on K3 surfaces: action on cohomology and related "Shioda Inose structures".*

The symplectic automorphisms of finite order on a K3 surface induce an essentially unique isometry on the second cohomology group of the K3 surface, i.e. the lattice $\Lambda_{K3} \simeq U^3 \oplus E_8^2$, as proved by Nikulin at the end of Seventies. In the particular case of the involutions this isometry is very well known and described by Morrison: it switches the two copies of E_8 and acts as the identity on the three copies of U. By using this, one is able to state several interesting results: the existence of the Shioda Inose structures; the description of the relations between the Picard groups of K3 surfaces with a symplectic involution and the one of their quotient; the presence of infinite towers of isogenous K3 surfaces. The aim of this talk is to present similar results for symplectic automorphisms of order 3 on K3 surfaces. We will describe explicitly the action of the isometry induced by such an automorphism on the second cohomology group of a K3 surface (as Morrison did for the involutions) by giving a different basis for the Λ_{K3} and then we will deduce results analogue to the ones mentioned in the case of the involutions; for example we will generalize the Shioda-Inose construction to our case. The talk is based on a joint project with Y. Prieto. (Received August 19, 2020)