Comparison of second order magnetic barriers at a mediant and noble irrational surfaces in the ASDEX UG tokamak CHRISTINA BURTON[1], HALIMA ALI, ALKESH PUNJABI, Hampton University — Ciraolo, Vittot and Chandre method of building invariant manifolds inside chaos in Hamiltonian systems is used in the ASDEX UG tokamak. In this method, a second order perturbation is added to the perturbed Hamiltonian. It creates an invariant torus inside the chaos, and reduces the plasma transport . The value and beauty of this method is that the perturbation that is added to the equilibrium Hamiltonian is at least an order of magnitude smaller than the perturbation that causes chaos. This additional term has a finite, limited number of Fourier modes. Resonant magnetic perturbations (m,n) = (3,2)+(4,3) are added to the field line Hamiltonian for the ASDEX UG. An area-preserving map for the field line trajectories in the ASDEX UG is used. The common amplitude δ of these modes that gives complete chaos between the resonant surfaces $\Psi 43$ and $\Psi 32$ is determined. Relative strength of magnetic barriers at these mediant and noble surfaces are studied. This work is supported by US Department of Energy grants DE-FG02-07ER54937, DE-FG02-01ER54624 and DE-FG02-04ER54793.

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