1056-35-1012 **Hamid Hezari*** (hezari@math.mit.edu), 77 Mass Ave, MIT/Department of Mathematics, Room 2-306, Cambridge, MA 02139, and **Steve Zelditch**. *Spectral rigidity of analytic plane domains with one mirror symmetry.*

This is a report of a recent joint work with Steve Zleditch on isospectral deformations of plane domains.

It is known that there exist non-isometric isospectral plane domains, but all of the known examples have corners and in particular are not smooth. The original problem of Kac, "Can one hear the shape of a drum?" is therefore open if one interprets "drum" to mean a smooth drum. The only domain known to be determined by its spectrum among all plane domains is the standard disc. It is not known if ellipses are spectrally determined, even among smooth plane domains. The purpose of this short talk is to prove that bounded real analytic plane domains with one symmetry are spectrally rigid among all real analytic domains, including those without any symmetries. The proofs are based on the calculation and study of variational derivatives of the "wave trace invariants" associated to a bouncing ball orbit. (Received September 19, 2009)