998-37-74 **Rafael De la Llave** (llave@math.utexas.edu), Department of Mathematics, The University of Texas at Austin, Austin, TX 78712-1082, and **Arturo Olvera*** (aoc@mym.iimas.unam.mx), IIMAS, UNAM, Ciudad Universitaria, 04510 Mexico D. F., DF, Mexico. *The obstruction criterion for non existence of invariant circles and renormalization.*

We formulate a conjecture which supplements the standard renormalization scenario for the breakdown of golden circle in twist maps. We show rigorously that if the conjecture was true then: -The stable manifold of the non-trivial fixed point would indeed be a boundary between the existence of smooth invariant tori and hyperbolic orbits with golden mean rotation number. -The obstruction criterion would be sharp in the universality class of the renormalization group. - If there is no invariant circle, there are hyperbolic sets with golden mean rotation number.

We also provide numerical evidence which suggests that the conjecture is true and discuss briefly the possibilities of providing a computer-assisted proof. (Received February 04, 2004)