BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA

INSTITUTO DE FÍSICA
"Luis Rivera Terrazas"

SEMINARIO
"DR. JESUS REYES CORONA"

"Choreography in Physics, in (non)-Newtonian gravity"

Dr. Alexander Turbiner
Instituto de Ciencias Nucleares, UNAM

By definition the choreography (dancing curve) is the trajectory on which n classical bodies move chasing each other without collisions. The first choreography (the Remarkable Figure Eight) at zero angular momentum was discovered unexpectedly by C Moore (Santa Fe Institute) at 1993 for 3 equal masses in R^3 Newtonian gravity numerically. At the moment about 6,000 choreographies are known, all numerically, in Newtonian gravity. Will GR support such choreographies? Some number of 3-body choreographies is known for Lennard- Jones potential (hence, relevant for molecular physics) and for some other potentials again numerically; it might be proved their existence for quarkonia potential, thus, for baryons.

Does exist (non)-Newtonian gravity for which dancing curve is known analytically? - Yes, a single example is known - it is algebraic lemniscate by Jacob Bernoulli (1694) - and it will be a concrete subject of the talk. Astonishingly, Newtonian Figure Eight coincides with algebraic lemniscate with $\chi 2$ deviation 10^{-7}. Both choreographies admit any odd numbers of bodies on them. 3-body choreography on lemniscate defines maximally superintegrable trajectory.

Talk will be accompanied by numerous animations.

Auditorio-IFUAP
Viernes 15 de Marzo de 2019
13:00 Hrs.