NOMBRE : **FENOMENOLOGÍA DE GRAVITACIÓN CUÁNTICA Y TÓPICOS RELACIONADOS**
TRADUCCIÓN : QUANTUM GRAVITY PHENOMENOLOGY AND RELATED TOPICS
SIGLA : FIM3408
CRÉDITOS : 15 UC / 9 SCT
MÓDULOS : 2 TEÓRICOS
REQUISITOS : FIM4545, FIZ0412, FIZ0411 Y FIZ0321
RESTRICCIONES : 030501 (Doctorado en Física)
CARÁCTER : OPTATIVO
TIPO DE ACTIVIDAD: CÁTEDRA
CALIFICACION : ESTANDAR
DISCIPLINA : FÍSICA

I.DESCRIPTION

This course provides advanced knowledge in Quantum Gravitation using both ground-based experiments and astrophysical observations, based on Quantum Gravity String Theory and Loop, to analyze main results without necessarily getting involved in the technical depths of the topic.

II.GOALS

1.Know and understand the concepts aimed at obtaining observable consequences of Quantum Gravitation using both terrestrial experiments and astrophysical observations.
2. Critically analyze different scenarios with violation of the Lorentz symmetry at a certain energy scale to analyze eventual phenomenological implications at low energies.

III.CONTENT

1.Introduction to string and brane theory.
2.Basic concepts of Loop Quantum Gravity.
3. Entropy of black holes in string theory.
4. Entropy of black holes in Loop Quantum Gravity.
5. Violation of invariance of Lorente (LIV). Introduction.
6.LIV: Non-covariant dispersion relationships.
7.LIV: Thresholds of reactions.
8.LIV: Experiments.

IV.METHODOLOGY

-Theoretical classes
-Reading articles / papers
-Conference sessions

V.EVALUATION

-Two tests of 20% each.
-Presentations of current papers of 20%.
-A final exam of 40%.

VI.BIBLIOGRAPHY

Gambini, R. and Pullin, J. "Loop, Knots, Gauge theories and quantum gravity", Cambridge Monographs on Mathematical Physics, Cambridge University, 1996.

Green, M.; Schwarz, J. and Witten, E. "Superstring Theory", Vols. 1-2, Cambridge Monographs on Mathematical Physics, Cambridge University Press 1987.

Jacobson, T., Liberati, S. and Mattingly, D. "Lorentz violation at high energy: concepts, phenomena and astrophysical constraints", Annals of Physics 321, 2016, 150-196.

Polschinski, J. "String Theory", Vols. 1-2, Cambridge Monographs on Mathematical Physics, Cambridge University Press, 1998.

Rovelli, C. "Quantum Gravity", Cambridge Monographs on Mathematical Physics, Cambridge University Press, 2004.