

# SEMINARIO MAPHYAG

***Elba García-Failde***

***(Jussieu)***

**The negative counterpart of Witten's r-spin conjecture**

***Lunes 18 de diciembre - 11:00***

***Aula 225 y online***

In 1990, Witten conjectured that the generating series of intersection numbers of psi classes is a tau function of the KdV hierarchy. This was first proved by Kontsevich. In 2017, Norbury conjectured that the generating series of intersection numbers of psi classes times a negative square root of the canonical bundle is also a tau function of the KdV hierarchy. In joint work with N. Chidambaram and A. Giacchetto (<https://arxiv.org/abs/2205.15621>), we prove Norbury's conjecture and obtain polynomial relations among kappa classes which were recently conjectured by Kazarian--Norbury. We also introduce a new collection of cohomology classes, which correspond to negative r-th roots (previously r=2) of the canonical bundle and form a cohomological field theory (CohFT), the negative analogue of Witten's r-spin CohFT, which turns out to be geometrically much simpler. We prove that the corresponding intersection numbers can be computed recursively using topological recursion (which I will briefly introduce) and, equivalently, W-constraints. The strategy draws inspiration from our proof, together with S. Charbonnier (<https://arxiv.org/abs/2203.16523>), of Witten's r-spin conjecture from 1993 (Faber--Shadrin--Zvonkine's theorem from 2010) that claims that (positive) r-spin intersection numbers satisfy the r-KdV hierarchy. We also obtain new (tautological) relations on the moduli space of curves in a (negative) analogous way to Pandharipande--Pixton--Zvonkine. The talk will be an overview of these four topics (r=2/>2; positive/negative) and their connections.

**M△PHYAG**