Bollettino Settimanale

Lunedì 25 marzo 2024	Martedì 26 marzo 2024	Mercoledì 27 marzo 2024	Giovedì 28 marzo 2024	Venerdì 29 marzo 2024
AULA CONVERSI ore 14.30 **SEMINARI INFN** **Hunting for Dark Matter and Exploring CEvNS in Reactor Neutrinos using Bubble Chambers** *Eric Vazquez Jauregui (Universidad Nacional Autónoma de México)* Bubble chambers excel as exceptional detectors for uncovering rare events like dark matter and neutrino interactions, owing to their insensitivity to electron recoils and their capability to reject backgrounds through acoustic bubble formation. The PICO collaboration explores spin-dependent WIMP couplings using fluorocarbon liquids, thereby pushing the boundaries of direct dark matter detection and setting the leading limits in the field. Concurrently, the SBC collaboration is developing scintillating bubble chambers utilizing argon as a target, with a dual focus on dark matter searches and reactor neutrino measurements via Coherent Elastic Neutrino- Nucleus Scattering (CEvNS). In this seminar, I will present the latest results from the PICO bubble chambers' dark matter search, exploring well-motivated models and their implications for our understanding of dark matter. Additionally, I will provide an update on the progress of the SBC scintillating bubble chambers program.	**AULA CONVERSI ore 16.00** **SEMINARI ALTRO** **Laplacian Renormalization Group for heterogeneous networks: information core, entropic transitions and scale transformations** *Andrea Gabrielli (University of Roma Tre)* SEMINARIO DI MECCANICA STATISTICA Complex networks often exhibit a rich architecture organized over multiple intertwined scales. Information pathways are expected to pervade these scales reflecting structural insights that are not manifest from analyses of the network topology. Moreover, small-world effects correlate the different network hierarchies making the identification of coexisting mesoscopic structures and functional cores a difficult task. We first present a thermodynamic interpretation of effective information pathways throughout complex networks based on information diffusion and statistical mechanics to shed light on these issues [1]. This directly lead us to a formulation of a new and general Renormalization Group scheme for heterogeneous networks that permits to change resolution scale in a physically motivated way. The Renormalization Group (RG) is the cornerstone of the modern theory of scale transformation, universality, and phase transitions, a powerful tool to scrutinize symmetries and organizational scales in dynamical systems. However, its network counterpart is particularly challenging due to correlations and small world coupling between intertwined scales. Here, we propose a Laplacian Renormalization Group (LRG) diffusion-based approach to complex networks, defining the coarse-grained supernodes and superedges concept à la Kadanoff, the equivalent of the momentum space RG procedure à la Wilson for graphs, and applying this RG scheme to real networks in a natural and parsimonious way to define proper scale transformation at arbitrarily resolution scale, study the topological organisation of the network [2] and detect characteristic structures [3].			