SEMINARIO
Departamentos de Física Teórica I y II
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TITULO: Gauge Color Codes

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ABSTRACT:

It is essential to discover quantum error-correcting techniques that can make quantum computing technology truly feasible. The line of research of topological codes has in this regard been very fruitful, as it has yielded prime candidate approaches for the implementation of realistic, scalable quantum computing architectures. This success is partially explained due to the connection of topological codes with condensed matter physics, which in addition has given rise to the notions of self-protected and self-correcting quantum memories. I will review several aspects of the subject and discuss a new family of topological codes with powerful features. Namely, universal computation can be achieved combining transversal gates and gauge fixing, while error-dectecting measurements involve only 4 or 6 qubits. Furthermore, these codes do not require multiple rounds of error detection to achieve fault-tolerance.