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Classification of disordered insulators in 1D

In this talk I will describe some of the mathematical aspects of disordered topological insulators. These are novel materials which insulate in their bulk but (may) conduct along their edge; the quintessential example is that of the integer quantum Hall effect. What characterizes these materials is the existence of a topological index, experimentally measurable and macroscopically quantized. Mathematically this is explained by applying algebraic topology to the space of appropriate quantum mechanical Hamiltonians; I will survey some recent results mainly concentrating on the classification problem in one dimension, where the problem reduces to studying spaces of unitaries (resp. orthogonal projections) which essentially-commute with a fixed projection.