Non-Hausdorff Differential Geometry

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In this talk we will introduce various aspects of non-Hausdorff manifolds, constructed from first principles. Typically, the Hausdorff property is included in the definition of a manifold for technical convenience, and the alternative may seem somewhat daunting:
without the Hausdorff property we do not have access to partitions of unity in their full generality, and thus various structures may or may not exist in the non-Hausdorff case. However, as we will see, certain topological representations allow us to circumvent this issue and recreate differential geometry without the need of arbitrarily-existent partitions of unity. To illustrate this idea, we will start from the topology of non-Hausdorff manifolds and then introduce more and more structure of various interest, finally finishing with a proof of de Rham's Theorem.