

BERNOULLIS TAFELRUNDE

MATH STUDENTS AND PHDS SEMINAR

Thursday, 26.03.2026, 12:15-13:00
Seminarraum 05.001, Spiegelgasse 5

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Partial Regularity for the Navier-Stokes Equations: The Caffarelli-Kohn-Nirenberg Theorem

ABSTRACT

The incompressible Navier-Stokes equations govern the motion of viscous fluids and remain a challenging open problem in modern mathematics. While global regularity in three dimensions is still unresolved, a partial result, derived by Caffarelli, Kohn and Nirenberg (1982), provides a quantitative description of where singularities may occur. In particular, a dimensional bound on the singular set was obtained.

In this talk, we introduce the framework of suitable weak solutions, a localized refinement of the classical Leray-Hopf theory, and present the idea of deriving the statement by Caffarelli, Kohn and Nirenberg: the singular set \mathcal{S} of any suitable weak solution satisfies $\dim_H(\mathcal{S}) \leq 1$ and even $\mathcal{P}^1(\mathcal{S}) = 0$. The proof combines parabolic scaling, local energy inequalities and a scale-invariant ε -regularity mechanism. We further briefly address the sharpness of this bound.



*Scan before 25.03.2026 at
16:00 to register for lunch*