UNIVERSITÀ DEGLI STUDI DELL'INSUBRIA

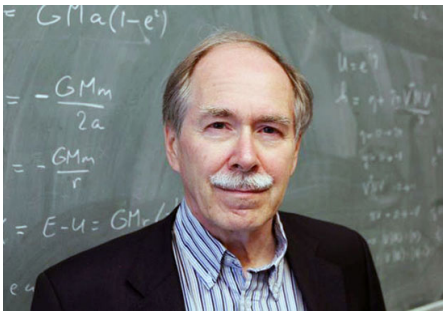
DIPARTIMENTO DI SCIENZA E ALTA TECNOLOGIA
DEPARTMENT OF SCIENCE AND HIGH TECHNOLOGY

SEMINAR ANNOUNCEMENT

Gerard 't Hooft, Nobel Prize in Physics 1999

Thursday, 16 October 2025, 3 PM
Room V2.11, Torre Building, Via Valleggio 11, Como

GENERAL RELATIVITY ON AN S2 SPHERE, APPLIED TO BLACK HOLES



Gerardus (Gerard) 't Hooft is a Dutch theoretical physicist, recipient of the Lorentz Medal in 1986 and the Nobel Prize in Physics in 1999, which he shared with Martinus J. G. Veltman for their fundamental contributions to the understanding of the electroweak interaction. He is widely regarded as one of the most influential figures in theoretical physics of the twentieth and twenty-first centuries. He is a great-nephew of Frits Zernike, who was awarded the Nobel Prize in Physics in 1953. In his honor, the asteroid 9491 Thooft was named, for which he even drafted a kind of symbolic "constitution" for potential future inhabitants.

't Hooft has made decisive contributions to several areas of theoretical physics. He was awarded the Nobel Prize for demonstrating the renormalizability of non-abelian gauge theories: the theories describing the fundamental interactions remain mathematically consistent even in the presence of spontaneous symmetry breaking. This achievement established the validity of the electroweak model developed by Glashow, Salam, and Weinberg.

In Como, Professor 't Hooft will present his holographic ideas concerning black hole physics.

Abstract: to better understand how to deal with Nature's degrees of freedom at the Planck scale, we demand that black holes will be an essential part of the needed descriptions. We concentrate on the horizon of a black hole, surrounded by what is almost a vacuum. The evolution of the system is described by something resembling a scattering matrix. Respecting CPT invariance, particles can move in and out. They do cause singularities of the curvature on the horizons, which must be taken into account by transforming them away. There is also a singularity where future and past horizons meet. It is a conical singularity that reminds us of string theory.