## **Topics in Geometric Analysis**



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## On the constancy of surface gravity (temperature) for compact null hypersurfaces

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In Lorentzian geometry, a generic compact null hypersurface may not admit a tangential lightlike geodesic vector field. A classical conjecture (Isenberg-Moncrief) states that a lightlike pregeodesic vector field of constant surface gravity can be found in the totally geodesic case, provided suitable energy or convergence conditions are imposed. Surface gravity is significant due to its physical interpretation as temperature, particularly in the context of black hole physics. In this talk I motivate interest in this problem. Moreover, I explain how riemannian flow theory has helped classify the topology and flow structures of horizons independently of non-degeneracy assumption (e.g. assumptions on the completeness of generators)

Presenter: Prof. MINGUZZI, Ettore (Universita' di Pisa)