Speaker : Alessio Marrani
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Title : *Jordan meets Freudenthal : a black hole exceptional story*
Abstract :

I will review some aspects of the electric-magnetic duality in extremal black hole solutions of Maxwell-Einstein-scalar theories (which can be regarded as the purely bosonic sector of ungauged extended supergravity) in four space-time dimensions. Such aspects include the attractor mechanism, the geometry of the scalar manifolds, the duality orbits and the moduli space associated to the various classes of attractors. In particular, I will highlight the role of Jordan algebras of rank three, of the corresponding reduced Freudenthal triple systems and of their exceptional symmetries, and I will elucidate the relation between the Hessian of the black hole entropy and the pseudo-Euclidean, rigid special (pseudo)Kähler metric of the pre-homogeneous spaces associated to the duality orbits. I will then introduce the Freudenthal duality map acting on the electric-magnetic fluxes, and present the non-linear invariance of the Bekenstein-Hawking black hole entropy. I will then consider the axiomatization of groups "of type E_7" as introduced by Brown, highlighting their role as electric-magnetic duality groups, as well as their relation to pre-homogeneous vector spaces. Finally, relying on some results of Dynkin and Solomon, I will present various novel (numerably) infinite classes of groups "of type E_7". I will conclude with an outlook on further developments.