

Title: *Topology of black hole Thermodynamics in Horava Lifshitz Gravity*

Abstract: In this work, we study the thermodynamic topology of a superfluid black hole solution in Horava gravity known as the Horava Lifshitz (HL) black hole in canonical ensemble. This exotic black hole solution belongs to a special class of black holes whose thermodynamics exhibit a line of (continuous) second order phase transitions known as λ phase transitions akin to those observed in the superfluidity of liquid ${}^4\text{He}$. We consider the Horava Lifshitz (HL) black hole as topological defects in their thermodynamic space and investigate its local and global topology by computing the winding numbers at those defects. We work with both 4 and 5 dimensional black hole solutions. We find that the topological charge of both the 4D and 5D black hole solutions is equal to 1. Hence, we infer that they belong to the same topological class.