

Abstract Submitted
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First Law for fields with Internal Gauge Freedom KARTIK PRABHU, The University of Chicago — We extend the analysis of Iyer and Wald to derive the First Law of blackhole mechanics in the presence of fields charged under an 'internal gauge group'. We treat diffeomorphisms and gauge transformations in a unified way by formulating the theory on a principal bundle. The first law then relates the energy and angular momentum at infinity to a potential times charge term at the horizon. The gravitational potential and charge give a notion of temperature and entropy respectively.

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