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Non- conserve mater energy-momentum (NCMEM) model of gravity: Reconstructing and Thermodynamics

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In this work, the Rastall model of gravity is generalized different models of non- conserve mater energy momentum model of gravity is constructed. In fact, we show that by imposing the ordinary or generalized form of Rastall assumption on perfect fluid energy-momentum tensor (EMT), one can find different $\{bf\ forms\}$ of modified Einstein's field equation (EFE). We investigate the thermodynamical behaviour of a special type of this generalization, which we called it non- conserve $f(R)$ model of gravity. We obtain that in the FLRW universe for $\lambda \neq 0$, the universe has an energy flow to apparent horizon and due to this fact the first law of thermodynamics of this model is modified. Moreover, we show that the GSL of model is modified and we $\{bf\ achieve\}$ the condition to keep the GSL.

Presenter: SAAIDI, Khaled (University of Kurdistan)

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