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**The notion of temperature in non-extensive systems** SERGIO DAVIS, GONZALO GUTIERREZ, Grupo de Nanomateriales, Departamento de Fisica, Facultad de Ciencias, Universidad de Chile — Temperature is a well defined concept in equilibrium Statistical Mechanics, however, its extension to non-extensive systems whose distribution of microstates belong to the q-exponential family is a controversial topic (see for example M. Nauenberg, Phys. Rev. E 67, 036114, 2003). In this work we discuss the implications of a recently derived identity (S. Davis and G. Gutierrez, Phys. Rev. E 86, 051136, 2012) for the estimation of the parameters $\beta$ and $q$ of the q-exponential analog of the canonical ensemble,

$$P(r,p) \propto \Theta(1-(1-q)\beta H)(1-(1-q)\beta H). \tag{1}$$

We show that the expectation of the Rugh estimator

$$R(x,p) = \nabla \cdot \frac{\vec{\omega}}{\vec{\omega}\cdot\nabla H},$$

where $\vec{\omega} = \vec{\omega}(\vec{r},\vec{p})$ is an arbitrary differentiable field, plays the role of the inverse temperature of the system regardless of the statistical ensemble.

Sergio Davis
Grupo de Nanomateriales, Departamento de Fisica,
Facultad de Ciencias, Universidad de Chile

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