Séminaire commun

Gravity for discrete space

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LPENS – L382 / L384 (24 Rue Lhomond)

Résumé

We assume that the points in volumes smaller than an elementary volume (which may have a Planck size) are indistinguishable in any physical experiment. This naturally leads to a picture of a discrete space with a finite number of degrees of freedom per elementary volume. In such discrete spaces, each elementary cell is completely characterized by displacement operators connecting a cell to the neighboring cells and by the spin connection. Motivated by the definition of Dirac operator in lattice gauge theories, and the gauge formulation of gravity, we define the torsion and curvature of the discrete spaces and show that in the limiting case of vanishing elementary volume, the standard results for the continuous curved differentiable manifolds are completely reproduced.