Contribution ID: **6** Type: **not specified**

Discretized Finsler-Hamilton Structure: a framework to quantize the general relativity (online talk)

Friday, 23 June 2023 11:20 (20 minutes)

To reconcile principles of general relativity (GR) and quantum mechanics (QM), differential and quantum geometry, duality-symmetry configurations of distance and momentum, the Born reciprocity principle (BRP), and noncommutative algebra, especially the relativistic generalized uncertainty principle (RGUP), are simultaneously applied on GR and QM. The latter integrates gravitational fields in the fundamental theory of QM. The earlier extends the four-dimensional Riemann to eight-dimensional Finsler-Hamilton geometry. The resulting structure is then characterized by coordinates and directions coupled to the momenta of a free particle, $\hat{x}_0^\mu$ and $\hat{p}_0^\nu$, respectively. With RGUP, the momentum operator $\hat{p}_0^\nu$ is modified to $\phi\hat{p}_0^\nu$, so that the resulting discretized Finsler-Hamilton structure $F(\hat{x}_0^\mu, \phi\hat{p}_0^\nu)$ is also 1-homogeneous in $\hat{p}_0^\nu$. The quantity $\phi = 1 + \beta\hat{p}_0^\rho\hat{p}_{0\rho}$, which exclusively depends on $\hat{p}_0^\nu$, is 0-homogeneous. The corresponding metric tensor could be deduced from the Hessian of $F^2(\hat{x}_0^\mu, \phi\hat{p}_0^\nu)$.

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