Einstein transforms

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The Einstein gyrovetor space algebraically regulates the Beltrami ball model of hyperbolic geometry. Introduced by Einstein and founded the special theory of relativity, Einstein addition is the standard velocity addition of relativistically admissible velocities. The algebraic and geometric structure of Einstein addition is sufficiently studied by Ungar. By Ungar's theory, commutativity and associativity in associative algebra and Euclidean geometry are extended to gyrocommutativity and gyroassociativity in nonassociative algebra and hyperbolic geometry.

In this talk, we shall consider the analysis theory related to Einstein addition, or its variant, Einstein transform. The Einstein transform is a bijection of the real unit ball. Its complexification turns out to be exactly the Möbius transformation in the complex unit ball. This observation makes us to give an investigation of Einstein transform through holomorphic approach, including the Einstein invariant Laplacian, Poisson kernel, Bergman kernel, Schwarz Lemma, and Heisenberg group in $\mathbb{R}^n$.