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Geometry and dynamics in hyperbolic spaces.

We survey our recent work exploring infinite-dimensional models of hyperbolic space and related dynamics of analogues of discrete groups. We emphasize differences between our work and the well-developed theory generalizing the study of Kleinian groups in finite dimensions to proper Gromov hyperbolic metric spaces. Certain phenomena induced by the greater degrees of freedom in infinite dimensions (e.g. the abundant lack of properness and the variety of “discrete” actions one may consider) forces some delicacy. Highlights will include a classification theorem for groups of isometries acting on arbitrary Gromov hyperbolic metric spaces, a generalization of the Bishop-Jones formula equating the Poincaré exponent to the Hausdorff dimensions of the uniformly-radial and radial/conical limit sets respectively, and an extension of Patterson-Sullivan theory for groups of divergence-type. This project is joint work with David Simmons (Ohio State) and Mariusz Urbański (North Texas). (Received September 23, 2012)