Distorted Brownian motions on space with varying dimension

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Abstract: Roughly speaking, a space with varying dimension consists of at least two components with different dimensions. In this talk, we will focus on the one, which can be treated as $\mathbb{R}^3$ joining a half line not contained by $\mathbb{R}^3$ at the origin. The aim is twofold. On one hand, we will introduce so-called distorted Brownian motions on this space with varying dimension (dBMVDs in abbreviation) and study their basic properties by means of Dirichlet forms. On the other hand, we will prove the joint continuity of the transition density functions of these dBMVDs and derive the short-time heat kernel estimates for them. This talk is based on a recent work (arXiv: 2008.06734) joint with Dr. Shuwen Lou at Loyola University Chicago.