ON MANDELBROT CASCADE MEASURES AT THE CRITICAL POINT

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We consider the fine structure of normalized Mandelbrot cascade measures at the critical point. We show that the measures are atomless, and a refinement of our argument gives explicit bounds for the modulus of continuity of the cumulative distribution function of the measures. The atomlessness of the cascade measures allows us to extend the earlier work of Barral on multifractal spectra to the case of critical Mandelbrot cascades. From the point of view of statistical physics, Mandelbrot cascade measures are mainly of interest as toy models of the exponential of the Gaussian free field. We briefly discuss this connection and show that the KPZ relation from quantum gravity holds for the random metrics induced by the cascade measures.