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Partition zeta functions, multifractal spectra, and tapestries of complex dimensions.

For a Borel measure and a sequence of partitions, we define a multifractal spectrum based on coarse Holder regularity. Specifically, the coarse Holder regularity values attained by a given measure and with respect to a sequence of partitions generate a sequence of lengths which in turn define certain Dirichlet series called the partition zeta functions. The abscissae of convergence of these functions define a multifractal spectrum whose concave envelope is the (geometric) Hausdorff multifractal spectrum which follow from a certain type of Moran construction. Moreover, our multifractal spectrum is shown to extend to a tapestry of complex dimensions for two specific atomic measures. (Received June 18, 2010)